ORDER NO. SD82062223C2

Service Manual

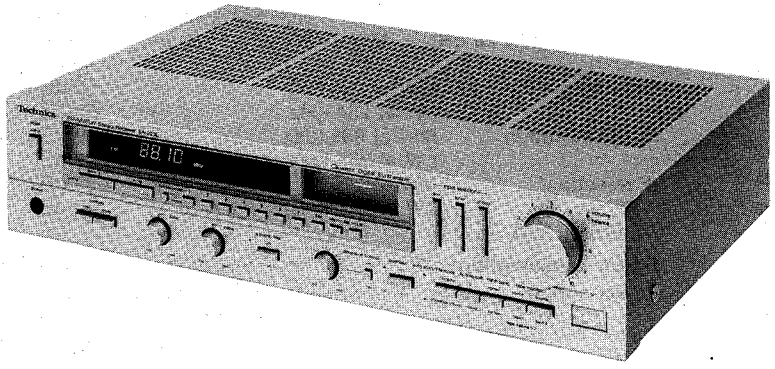
FM/MW/LW Stereo Receiver

SA-323L

[EX], [EF], [EB], [EK]

SA-323L(K)

[EX]



* The cabinet and front panel are available in black color and silver types.
* The black type model is provided with (K) in the Service Manual.

Areas

* [EX] is available in Switzerland and Scandinavia.
* [EF] is available in France.
* [EB] is available in Belgium.
* [EK] is available in United Kingdom.

Specifications

(Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output	
both channels driven	2 × 40W (4Ω)
	2 × 35W (8Ω)
40 Hz~16 kHz continuous power output	
both channels driven	2 × 40W (4Ω)
	2 × 35W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 40W (4Ω)
	2 × 37W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.03% (4Ω)
	0.007% (8Ω)
rated power at 40 Hz~16 kHz	0.03% (4Ω)
	0.007% (8Ω)
rated power at 1 kHz	0.007% (4Ω)
	0.007% (8Ω)
half power at 20 Hz~20 kHz	0.007% (8Ω)
half power at 1 kHz	0.001% (8Ω)
−26 dB power at 1 kHz	0.08% (4Ω)
50 mW power at 1 kHz	0.12% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.03%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.01%
Power bandwidth	
both channels driven, −3 dB	5 Hz~40 kHz (4Ω)
Damping factor	15 (4Ω), 30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
AUX	150 mV/22kΩ
TAPE 2	150 mV/22kΩ
TAPE 1 REC/PLAY	180 mV/25kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
Frequency response	
PHONO	RIAA standard curve
	±0.8 dB (30 Hz~15 kHz)
AUX, TAPE	5 Hz~70 kHz (−3 dB)
S/N	
rated power (4Ω)	
PHONO	75 dB (IHF, A: 80 dB)
AUX, TAPE 1, 2	88 dB (IHF, A: 95 dB)
−26 dB power (4Ω)	
PHONO	64 dB
AUX, TAPE 1, 2	66 dB
50 mW power (4Ω)	
PHONO	62 dB
AUX, TAPE 1, 2	62 dB
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Subsonic filter	30 Hz, −6 dB/oct.
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage and impedance	
TAPE, 1, 2 REC OUT	150 mV
TAPE 1 REC/PLAY	30 mV/82kΩ
Channel balance, AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, AUX 1 kHz	55 dB
Headphones output level and impedance	390 mV/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
	(0.05 MHz-step)
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.08%
STEREO	0.15%
S/N	
MONO	60 dB (78 dB, IHF)
STEREO	58 dB (72 dB, IHF)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Frequency response	20 Hz~15 kHz, +1 dB~ −2 dB
Alternate channel selectivity	
wide	±400 kHz, 65 dB
narrow	±300 kHz, 70 dB
Capture ratio	1 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−35 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range		
MW		522~1611 kHz (9 kHz step), 530~1620 kHz (10 kHz step)
LW		155~353 kHz (normal), 153~351 kHz (−2 kHz shift)
Sensitivity (S/N 20 dB)	**MW**	30 μV, 300 μV/m
	LW	45 μV
Selectivity (±9 kHz)	**MW at 999 kHz**	55 dB
	LW at 254 kHz	55 dB
Image rejection	**MW at 999 kHz**	40 dB
	LW at 254 kHz	40 dB
IF rejection	**MW at 999 kHz**	50 dB
	LW at 254 kHz	45 dB

■ GENERAL

Power consumption	320W
Power supply	AC 50 Hz/60 Hz, 220V (For continental Europe) AC 50 Hz/60 Hz, 240V (For United Kingdom)
Dimensions (W×H×D)	430 × 97 × 300 mm (16-15/16" × 3-13/16" × 11-13/16")
Weight	7 kg

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

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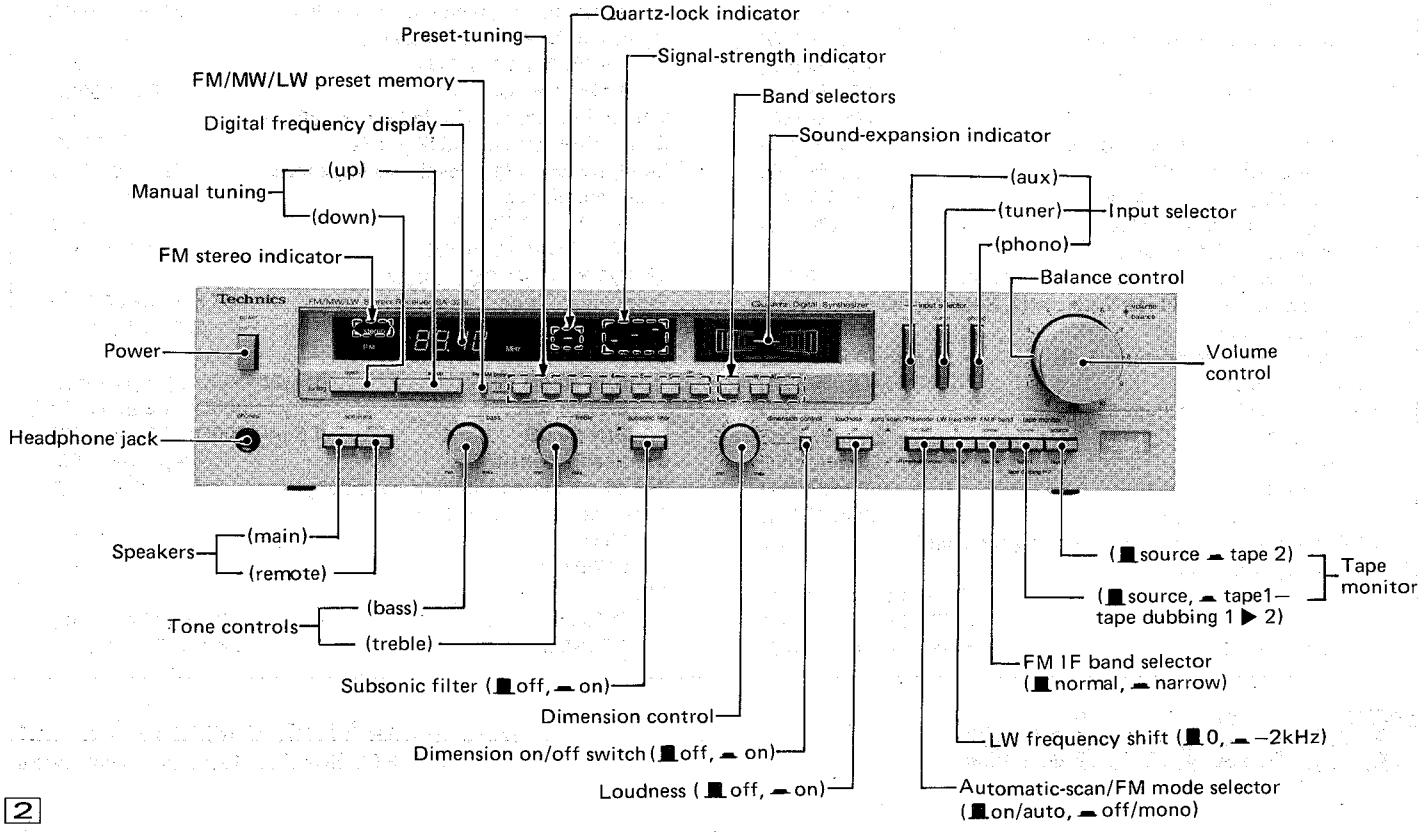
■ LOCATION OF CONTROLS



ORDER NO. SD82062223C2-A

DEUTSCH

FM/MW/LW
Stereo Receiver

SA-323L/SA-323L(K)

- This booklet contains the specifications and adjusting procedures for SA-323L, written in Germany and French.
- File this manual together with the SA-323L service manual (Order No. SD82062223C2).

DEUTSCH

■ TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz
beide Kanäle ausgesteuert 2 × 40W (4 Ω)
2 × 35W (8 Ω)

Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz
beide Kanäle ausgesteuert 2 × 40W (4 Ω)
2 × 35W (8 Ω)

Dauerton-Ausgangsleistung bei 1 kHz
beide Kanäle ausgesteuert 2 × 40W (4 Ω)
2 × 37W (8 Ω)

Gesamtklirrfaktor
Nennleistung bei 20 Hz ~ 20 kHz 0,03% (4 Ω)
0,007% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz 0,03% (4 Ω)
0,007% (8 Ω)
Nennleistung bei 1 kHz 0,007% (4 Ω)
0,007% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz
0,007% (8 Ω)
halbe Nennleistung bei 1 kHz 0,001% (8 Ω)
−26 dB Leistung bei 1 kHz 0,08% (4 Ω)
50 mW Leistung bei 1 kHz 0,12% (4 Ω)

Intermodulationsfaktor
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω 0,03%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω
0,01%

Leistungsbandbreite
beide Kanäle ausgesteuert bei −3 dB
5 Hz ~ 40 kHz (4 Ω)

Dämpfungsfaktor 15 (4 Ω), 30 (8 Ω)

Eingangsempfindlichkeit und -impedanz
Phono 2,5 mV/47 kΩ
Aux 150 mV/22 kΩ
Tape 2 150 mV/22 kΩ
Tape 1 Aufnahme/Wiedergabe (TAPE 1 REC/PLAY)
180 mV/25 kΩ

Maximale TA-Eingangsspannung (1 kHz, eff.) 150 mV

Geräuschabstand
Nennleistung (4 Ω)
Phono 75 dB (nach IHF, A: 80 dB)
Aux, Tape 1, 2 88 dB (nach IHF, A: 95 dB)
−26 dB Leistung (4 Ω)
Phono 64 dB
Aux, Tape 1, 2 66 dB
50 mW Leistung (4 Ω)
Phono 62 dB
Aux, Tape 1, 2 62 dB

Frequenzgang
Phono RIAA-Standardkurve
±0,8 dB (30 Hz ~ 15 kHz)
Aux, Tape 5 Hz ~ 70 kHz(−3 dB)

Klangregler
Baßregler (BASS) 50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE) 20 kHz, +10 dB ~ −10 dB

Tiefenfilter 30 Hz, −6 dB/Okt.

Gehörrichtige Lautstärkekorrektur (Loudness)
(bei −30 dB Ausgangsleistung) 50 Hz, +9 dB

Ausgangsspannung und -impedanz
Tape 1/2 Aufnahme (TAPE 1, 2 REC OUT)
150 mV
Tape 1 Aufnahme/Wiedergabe (TAPE 1 REC/PLAY)
30 mV/82 kΩ

Kanalabweichung (Aux, 250 Hz ~ 6300 Hz) ±1 dB

Übersprechdämpfung (Aux, 1 kHz) 55 dB

Kopfhörerpegel und -impedanz 390 mV/330 Ω

Lautsprecherimpedanz
MAIN oder REMOTE 4 Ω ~ 16 Ω
MAIN und REMOTE 8 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich 87,50 ~ 108,00 MHz (0,05 MHz-step)

Eingangsempfindlichkeit
S/R 30 dB 1,9 μV (300 Ω), 1,3 μV (75 Ω)
S/R 26 dB 1,7 μV (300 Ω), 1,2 μV (75 Ω)
S/R 20 dB 1,5 μV (300 Ω), 0,9 μV (75 Ω)

Nutzempfindlichkeit nach IHF 1,9 μV (nach IHF '58)

Stereoumschaltschwelle bei 46 dB nach IHF 22 μV/75 Ω

Gesamtklirrfaktor
Mono 0,08%
Stereo 0,15%

Geräuschabstand
Mono 60 dB (78 dB nach IHF)
Stereo 58 dB (72 dB nach IHF)

Frequenzgang 20 Hz ~ 15 kHz (+1 dB ~ −2 dB)

Trennschärfe bei Störsender
breit ±400 kHz, 65 dB
schmal ±300 kHz, 70 dB

Einfangverhältnis 1 dB

Spiegelfrequenz-Dämpfung bei 98 MHz 55 dB

ZF-Dämpfung bei 98 MHz 75 dB

Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz 82 dB

AM-Unterdrückung 55 dB

Übersprechdämpfung
1 kHz 40 dB
10 kHz 30 dB

Trägerrest
19 kHz −35 dB (−35 dB nach IHF)
38 kHz −50 dB (−50 dB nach IHF)

Kanalabweichung (250 Hz ~ 6300 Hz) ±1,5 dB

Begrenzereinsatz 1,2 μV

Bandbreite
ZF-Verstärker 180 kHz
UKW-Demodulator 1000 kHz

Antennenanschluß 300 Ω (symmetrisch)
75 Ω (unsymmetrisch)

■ AM-TUNERTEIL

Wellenbereiche

MW	522~1611 kHz (9 kHz-Schritte), 530~1620 kHz (10 kHz-Schritte)
LW	155~353 kHz (normal), 153~351 kHz (−2 kHz shift)

Eingangsempfindlichkeit (S/R 20 dB)

MW	30 μV, 300 μV/m
LW	45 μV

Trennschärfe (±9 kHz)	**MW bei 999 kHz**	55 dB
	LW bei 254 kHz	55 dB
Spiegelfrequenz-Dämpfung	**MW bei 999 kHz**	40 dB
	LW bei 254 kHz	40 dB
ZF-Dämpfung	**MW bei 999 kHz**	50 dB
	LW bei 254 kHz	45 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	320 W
Netzspannung	Wechselstrom AC 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 97 × 300 mm
Gewicht	7 kg

■ EINSTELLUNGSANWEISUNGEN

AM-EINSTELLUNG

*** Stellungen und zu benutzende Geräte**

1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM)
2. Oszilloskop.
3. AM (MW)-Meßsender (AM-SG)
4. Bereichsschalter . . . . . MW oder LW.
5. AM Wellenverteilunas-Wahlschalter auf Position "10 kHz" stellen.
6. Die Netzspannung auf ihren Sollwert einstellen.
7. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
8. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERFAHREN
	MW-HF-ABGLEICH			* Bandwahlschalter in die "MW"-position stellen.		
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	530 kHz (400 Hz Modulat., 30%)	530 kHz	Zwischen TP202 und Erdung Gleichstrom-Voltmeter schließen.	L252 (Osc. Spule)	1. L252 so justieren, daß die vom Gleichstrom-Voltmeter gemessene Spannung 1,1V ± 0,2V beträgt.
2		610 kHz (400 Hz Modulat., 30%)	610 kHz	Oszilloskop oder Wechselstrom-Voltmeter über den Lautsprecher schließen.	T201 (Ant. Spule)	1. Auf max. Ausgang abgleichen. 2. Den Ferritkern von T201 mit einem Schraubendreher justieren.
3		1500 kHz (400 Hz Modulat., 30%)	1500 kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (2) und (3) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.
	LW-HF-ABGLEICH			* Bandwahlter in die "LW"-position stellen.		
4	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	155 kHz (400 Hz Modulat., 30%)	155 kHz	Zwischen TP202 und Erdung Gleichstrom-Voltmeter schließen.	L251 (Osc. Spule)	1. L251 so justieren, daß die vom Gleichstrom-Voltmeter gemessene Spannung 1,0V ± 0,2V beträgt.
5		155 kHz (400 Hz Modulat., 30%)	155 kHz	Oszilloskop oder Wechselstrom-Voltmeter über den Lautsprecher schließen.	T203 (Ant. Spule)	1. Auf max. Ausgang abgleichen. 2. Den Ferritkern von T203 mit einem Schraubendreher justieren.
6		353 kHz (400 Hz Modulat., 30%)	353 kHz		CT202 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (5) und (6) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

* **Stellungen und zu benutzenden Geräte**
1. UKW-Meßsender (FM-SG)
2. Verzerrungsmesser.
3. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM).
4. Signalfrequenzmesser (meßar für 19 kHz und 108 MHz)
5. UKW 300-Ohm Kunstantenne (Abb. 9)
6. Den Eingangswähler auf die "FM"-position stellen.
7. Den Auto-Scan/UKW-Betriebsart-Wahlschalter in die Position "off (manual) FM mono" stellen.
8. Die anderen Einstellungen entsprechen den AM (MW)-Einstellungen.

* **Vorbereitung AM UKW-Messender (FM-SG)**
1. SG-Ausgang über 300-Ohm UKW Kunstantenne an den Antenneneingang des Gerätes schließen.
2. Den normale Eingang des Gerätes beträt 60 dB (1mV), 400 Hz 100% Modulation. (Wegen Verwendung der Kunstantenne muß der Signalausgang 12 dB plus (IHF) sein: d.h. beim Eingang von 60 dB soll der Signalausgang 72 dB sein.)

	FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERFAHREN
	ANSCHLUSS	FREQUENZ				
	UKW-ZF-ABGLEICH					
7	———	Kein Signal	100.1 MHz	Ein Gleichstromröhren-voltmeter zwischen TP101 und TP102 über eine Drosselspule verbinden. (Siehe Abb. 10)	T101 (Diskriminator FT)	Den Kern von T101 so justieren, daß die gemessene Spannung im signal Modus 0mV im 300mV Bereich beträgt.
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
8	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. (60 dB in den Antenneneingang leiten.)	100.1 MHz (400 Hz Modulat., 100%)	100.1 MHz	Klirrfaktor-Meßbrücke über den Lautsprecher schließen.	T102 (Diskriminator FT)	1. Schritt (7) im empfangsfreien Zustand prüfen. 2. Falls eine Abweichung vorhanden ist, T101 erneut abgleichen. 3. T102 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.
	UKW-MPX-PILOTABGLEICH (VCO)					
9	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. (Mono-Signal)	100.1 MHz (Modulierte Welle)	100.1 MHz	Den Signalfrequenz-messer durch 100kΩ Widerstand an Anschluß TP301 anschließen.	VR301 (VCO)	1. Den Auto-Scan/UKW-Betriebsart-Wahlschalter in die Position "on/FM auto" stellen. 2. VR301 auf 19 kHz ± 30 Hz einstellen.

VERSTÄRKERJUSTIERUNG

* **Einstellung der zu benutzenden Regler und Instrumente**
* Vor der Abstimmung R601 und R602 bis zum Anschlag entgegen dem Uhrzeigersinn drehen.

1. Lautsprecher-Wahlschalter ..... off
2. Lautstärke ..... 0 (Minimalstellung)
3. Raumklangschalter ..... off
4. Gleichstromvoltmeter ..... 5mV Meßbereich erforderlich

Nr.	EINSTELLUNGEN	GLEICHSTROMVOLTMETER-VERBINDUNGEN	EINSTELLUNGSPUNKTE	EINSTELLUNGSVORGANG
10	ICQ	L-Kanal Zwischen TP601 und TP603 (Minustest)	VR601 (L-Kanal)	* R601 (L-Kanal) und R602 (R-Kanal) auf ungefähr 20mV, nach 1 Minuten Anwärmezeit, einstellen.
		R-Kanal Zwischen TP602 und TP604 (Minustest)	VR602 (R-Kanal)	

FRANÇAIS

■ CARACTERISTIQUES (DIN 45 500) (Sujet á changement sans préaris.)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue de 20 Hz~20 kHz,
les deux canaux en circuit 2 × 40W (4Ω)
2 × 35W (8Ω)
Puissance de sortie continue de 40 Hz~16 kHz,
les deux canaux en circuit 2 × 40W (4Ω)
2 × 35W (8Ω)
Puissance de sortie continue à 1 kHz
les deux canaux en circuit 2 × 40W (4Ω)
2 × 37W (8Ω)
Distorsion harmonique totale
à puissance nominale (20 Hz~20 kHz) 0,03% (4Ω)
0,007% (8Ω)
à puissance nominale (40 Hz~16 kHz) 0,03% (4Ω)
0,007% (8Ω)
à puissance nominale (1 kHz) 0,007% (4Ω)
0,007% (8Ω)
à demi-puissance (20 Hz~20 kHz) 0,007% (8Ω)
à demi-puissance (1 kHz) 0,001% (8Ω)
puissance de −26 dB à 1 kHz 0,08% (4Ω)
puissance de 50 mW à 1 kHz 0,12% (4Ω)
Distorsion d'intermodulation
à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω 0,03%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0,01%
Réponse de fréquences
les deux canaux en circuit, −3 dB 5 Hz~40 kHz (4Ω)
Coefficient d'amortissement 15 (4Ω), 30 (8Ω)
Sensibilité et impédance d'entrée
PHONO 2,5 mV/47kΩ
AUX (AUX) 150 mV/22kΩ
BANDE 2 (TAPE 2) 150 mV/22kΩ
BANDE 1, ENREGISTREMENT/LECTURE (TAPE 1 REC/PLAY) 180 mV/25kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS) 150 mV
Signal/Bruit
à puissance nominale (4Ω)
PHONO 75 dB (IHF, A: 80 dB)
AUX, BANDE 1, 2 (AUX, TAPE 1, 2) 88 dB (IHF, A: 95 dB)
puissance de −26 dB (4Ω)
PHONO 64 dB
AUX, BANDE 1, 2 (AUX, TAPE 1, 2) 66 dB
puissance de 50 mW (4Ω)
PHONO 62 dB
AUX, BANDE 1, 2 (AUX, TAPE 1, 2) 62 dB
Réponse de fréquence
PHONO Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
AUX, BANDE (AUX, TAPE) 5 Hz~70 kHz (−3 dB)
Réglage de la tonalité
BASSES (BASS) 50 Hz, +10 dB~ −10 dB
AIGUS (TREBLE) 20 kHz, +10 dB~ −10 dB
Filtre subsonique 30 Hz, −6 dB/oct.
Compensateur physiologique (volume à −30 dB) 50 Hz, +9 dB
Tension de sortie et impédance
SORTIE ENREGISTREMENT/BANDE 1, 2 (TAPE 1, 2 REC OUT) 150 mV
ENREGISTREMENT/LECTURE BANDE 1 (TAPE 1 REC/PLAY) 30 mV/82kΩ
Equilibrage des canaux, AUX 250 Hz~6 300 Hz ±1 dB
Séparation des canaux, AUX 1 kHz 55 dB
Niveau de sortie des casques et impédance 390 mV/330Ω
Impédance de charge
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE) 4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE) 8Ω~16Ω

■ SECTION SYNTONISATEUR FM

Gamme de fréquence 87,50~108,00 MHz (0,05 MHz par palier)
Sensibilité
S/B 30 dB 1,9 μV (300Ω), 1,3 μV (75Ω)
S/B 26 dB 1,7 μV (300Ω), 1,2 μV (75Ω)
S/B 20 dB 1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilité utilisable IHF 1,9 μV (IHF '58)
Sensibilité stéréo au seuil de 46 dB, IHF 22 μV/75Ω
Distorsion harmonique totale
MONO 0,08%
STEREO 0,15%
Signal/Bruit
MONO 60 dB (78 dB, IHF)
STEREO 58 dB (72 dB, IHF)
Réponse de fréquence 20 Hz~15 kHz, +1 dB~ −2 dB
Sélectivité alternée par canal
Large ±400 kHz, 65 dB
Etroite ±300 kHz, 70 dB
Taux de capture 1 dB
Rejection d'image à 98 MHz 55 dB
Rejection FI à 98 MHz 75 dB
Rejection de réponse parasite à 98 MHz 82 dB
Suppression AM 55 dB
Séparation stéréophonique
1 kHz 40 dB
10 kHz 30 dB
Fuite de porteuse
19 kHz −35 dB (−35 dB, IHF)
38 kHz −50 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz) ±1,5 dB
Point de limite 1,2 μV
Largeur de bande
Amplificateur FI 180 kHz
Démodulateur FM 1000 kHz
Bornes d'antenne 300Ω (symétrique)
75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence
PO (MW) 522~1611 kHz (9 kHz par palier), 530~1620 kHz (10 kHz par palier)
GO (LW) 155~353 kHz (normal), 153~351 kHz (−2 kHz shift)

Sensibilité (S/B 20 dB)	**PO (MW)**	30 μV, 300 μV/m
	GO (LW)	45 μV
Sélectivité (±9 kHz)	**PO (MW) à 999 kHz**	55 dB
	GO (LW) à 254 kHz	55 dB
Réjection d'image	**PO (MW) à 999 kHz**	40 dB
	GO (LW) à 254 kHz	40 dB
Réjection FI	**PO (MW) à 999 kHz**	50 dB
	GO (LW) à 254 kHz	45 dB

■ DIVERS

Consommation	320W
Alimentation	CA 50 Hz/60 Hz, 220V (Pour l'Europe)
Dimensions (L×H×Pr)	430 × 97 × 300 mm
Poids	7 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

■ MESURAGES ET RÉGLAGES

RÉGLAGE DE AM

• Réglage et équement utilisé
1. Voltmètres électronique de courant altèrnatif et de courant continu (VTVM).
2. Oscilloscope
3. Générateur du signal AM (AM-SG)
4. Sélecteur de gamme . . . . . AM (Alignement MW/LW)
5. Régler le sélecteur d'attribution AM sur la position "10kHz".
6. Conservel la tension du secteur à la tension nominale.
7. Le signal du générateur ne doit pas étre plus élvé qu'il n'est nécessaire à obtenir une lecture en sortie.
8. Utiliser un tournevis non-métallique pour la réglage.

No.	AM GENERATEUR BRANCHEMENT	AM GENERATEUR FREQUENCE	FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE RF-MW	* Régler le commutateur de gammes d'ondes sur la position "MW"				
1	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible)	530kHz (modulé à 30% par 400Hz)	530kHz	Brancher le voltmètre à courant continu entre TP202 et la prise de terre.	L252 (Bobin Osc.)	1. • Régler L252 de telle sorte que le voltage mesuré par le voltmètre à courant continu soit de 1,1V± 0,2V.
2		610kHz (modulé à 30% par 400Hz)	610kHz	Branchez un c.a. voltmétre électronique ou nu oscilloscope sur les bornes de haut-parleur	T201 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau farrite de T201 à l'aide d'un tournevis.
3		1500kHz (modulé à 30% par 400Hz)	1500kHz		CT201 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (1) et (2) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.
	REGLAGE DE RF-MW	* Régler le commutateur de gammes d'ondes sur la position "LW"				
4	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible)	155kHz (modulé à 30% par 400Hz)	155kHz	Brancher le voltméter à courant continu entre TP202 et la prise de terre.	L251 (Bobin Osc.)	1. Régler L251 de telle sorte que le voltage mesuré par le voltmètre à courant continu soit de 1,1V± 0,2V.
5		155kHz (modulé à 30% par 400Hz)	155kHz	Branchez un c.a. voltmétre électronique ou nu oscilloscope sur les bornes de haut-parleur.	T203 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de T203 à l'aide d'un tournevis.
6		353kHz (modulé à 30% par 400Hz)	353kHz		CT202 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (5) et (6) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.

RÉGLAGE DE FM

• Réglage et équipement untilisé
1. Générateur du signal FM (FM-SG)
2. Jauge de distorsion.
3. Voltmètres électronique de courant alternatif et de courant continu (VTVM).
4. Compteur de fréquence (19kHz et 108MHz mesurable).
5. Antenne fictive FM, 300 ohms (Fig. 9)
6. Sélecteur . . . . . FM (Alignement FM)
7. Placer le sélecteur de mode d'Exploration automatique/FM sur la position "off (manual)/FM mono".
8. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).

• Préparation du générateur de signal FM (FM-SG)
1. Alimenter la sortie SG à la borne de l'antenne de l'appareil, par l'antenne fictive FM, 300 ohms.
2. L'éntrée standard de l'appareil est de 60dB (1mV), 400Hz, 100% de modulation (à cause de l'utilisation de l'antenne fictive, la sortie SG doit être de plus 12dB (IHF). Ce qui signifie que guand l'entrée est de 60dB, la sortie SG doit être de 72dB.)

No.	FM GENERATEUR BRANCHEMENT	FM GENERATEUR FREQUENCE	FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE FI-FM					
7	———	Sans Signal	100.1MHz	Brancher le voltmètre électronique a c.c. aux bornes TP101 et TP102. (Voir la Fig. 10)	T101 (Transfor FI discri.)	Régler le noyau T101 de telle sorte que le voltage mesuré dans le mode sans signal, soti de 0mV dans la gamme des 300mV.
	REGLAGE DE LA DISTORSION FM EN MONO					
8	Branchez sur la prise d'antenne FM à travers une antenne fictive FM. (Niveau de sortie du générateur 60dB)	100.1MHz (modulé à 100% par 400Hz)	100.1MHz	Branchez un distor-tion métre sur les bornes de haut-parleur de appareil.	T102 (Transfor FI discri.)	1. Vérifier à l'étape (7) s'il n'y a pas de mode de signal 2. S'il est dévié, régler à nouveau T101. 3. Régler le noyou T102 de telle sorte que la distor-tion des canaux droit et gauche soit la plus faible.
	REGLAGE (VCO) PILOTE MULTIPLEX FM					
9	Branchez sur la prise d'antenne FM à travers une antenne fictive FM. (Signal monoscous-tique.)	100.1MHz (Non modulé)	100.1MHz	Brancher le compteur de fréquences à la borne TP301 par l'intermédiaire d'une résistance de 100kΩ.	VR301 (VCO)	1. Placer le sélecteur de mode d'Exploration auto-matique/FM sur "on/FM auto". 2. Régler VR301 sur 19kHz ± 30Hz.

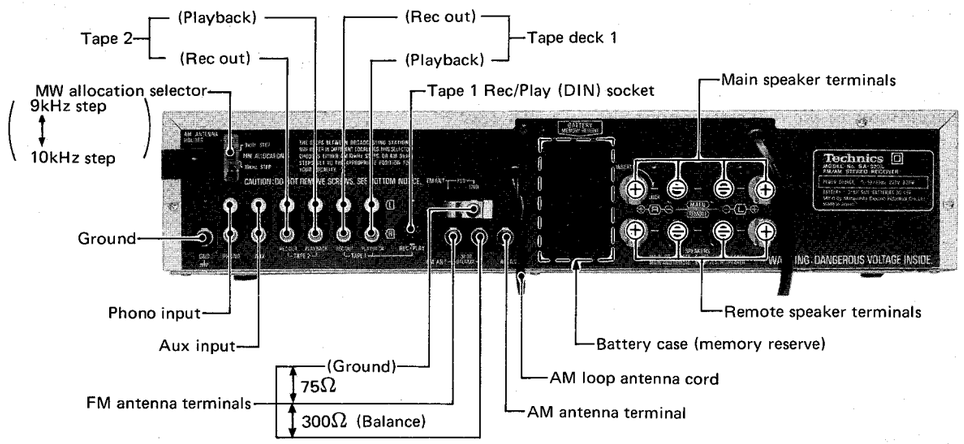
MISE AU POINT DE L'AMPLIFICATEUR

* Réglage des commandes et des appareils à utiliser.
* Avant la mise au point, VR601 et VR602 devront être tournés dans le sens inverse des aiguilles d'une montre.

1. Interrupteur du haut-parleur . . . . . hors circuit ("off") principal
2. Interrupteur du haut-parleur . . . . . hors circuit ("off") auxiliaire
3. Volume sonore . . . . . 0 (minimum)
4. Voltmètre à C.C. (capable de mesurer 5 mV)
5. Commutateur de dimensionnement . . . hors circuit marche/arrêt

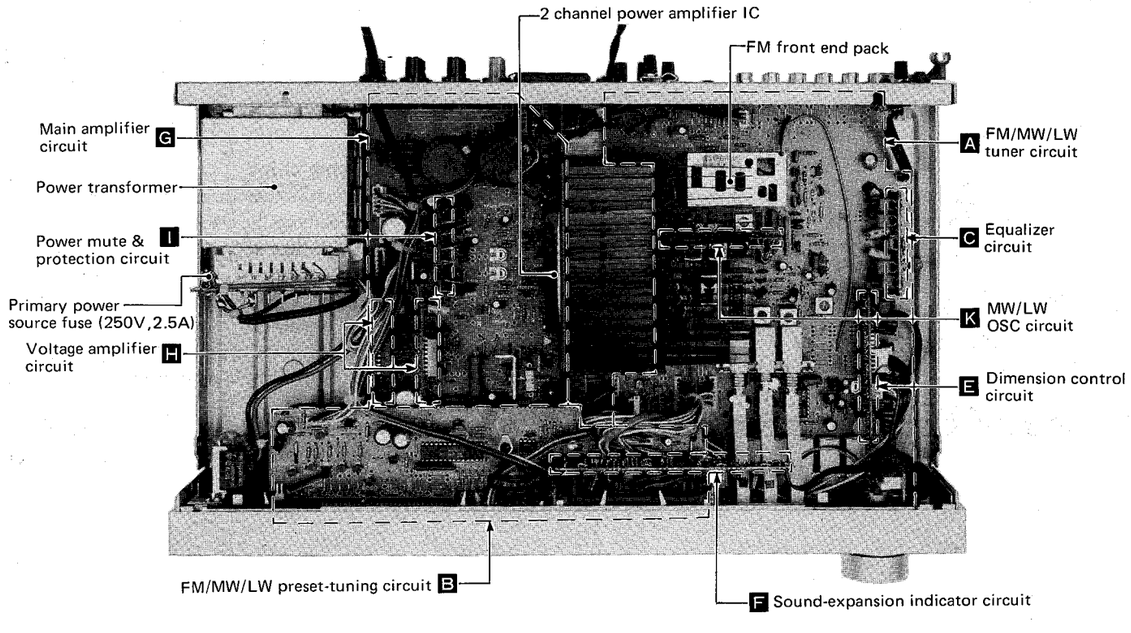
No.	MISES AU POINT	RACCORDEMENT DU VOLTMETER A.C.C.	PIECES A REGLER	PROCEDURE DE MISE AU POINT
10	Réglage de ICQ	(Canal de gauche) Entre TP601 et TP603 (sonde négative). (Canal de droite) Entre TP602 et TP604 (sonde négative).	VR601 (canal de gauche) VR602 (canal de droite)	Ajuster VR601 (canal de gauche) et VR602 (canal de droite) sur approx. 20 mV après une minute de temps de réchauffement.

Printed in Japan
82063600 Ⓗ YK



***Phono input capacitance is about 150pF.**

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  *220V (50/60 Hz) for Continental Europe.
  *240V (50/60 Hz) for United Kingdom.


2 channel power amplifier IC
FM front end pack
Main amplifier circuit G
Power transformer
Power mute & protection circuit I
Primary power source fuse (250V, 2.5A)
Voltage amplifier circuit H
A FM/MW/LW tuner circuit
C Equalizer circuit
K MW/LW OSC circuit
E Dimension control circuit
FM/MW/LW preset-tuning circuit B
F Sound-expansion indicator circuit

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

Note:

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

■ BEFORE REPAIR AND ADJUSTMENT

Turn off the power supply and short-circuit both ends of power supply condensers (C704, C705, 8200μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Avoid short-circuit with a screwdriver or the like otherwise the transistors or diodes may break down. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a voltage requlator to make sure that the current consumed is free of abnormality.

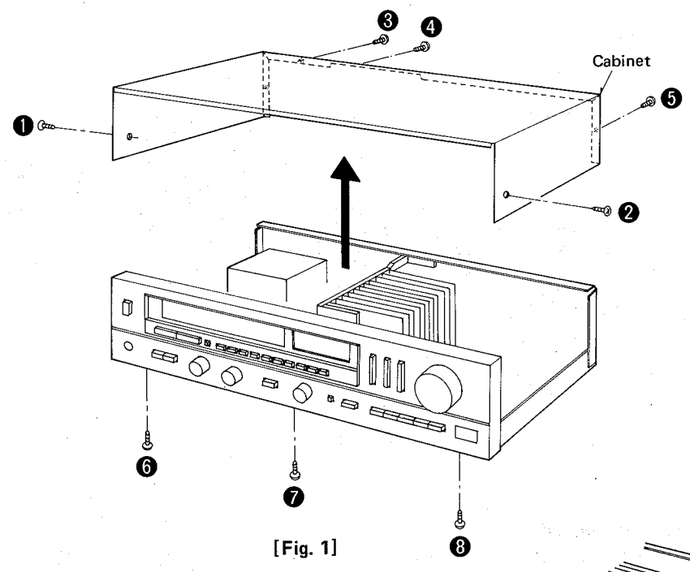
The current consumed at 60 Hz/50 Hz in no-signal mode is shown below with respect to supply voltage 220V/240V.

Power supply voltage		220V	240V
Current consumed	50 Hz	100 ~ 330 mA	70 ~ 300 mA
	60 Hz	90 ~ 320 mA	80 ~ 280 mA

■ DISASSEMBLY INSTRUCTIONS

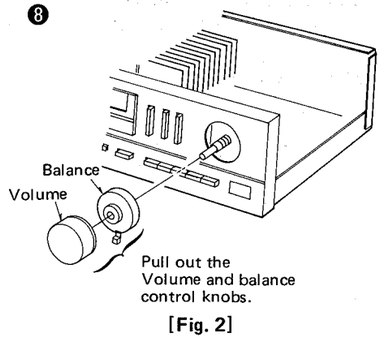
- **How to remove the front panel**

1. Remove the 2 setscrews (Fig. 1: ❶, ❷) on the side and 3 setscrews (Fig. 1: ❸ ~ ❺) on the back of the cabinet.
2. Remove the cabinet by raising it in the direction of the arrow (Fig. 1).
3. Remove the 3 setscrews (Fig. 1: ❻ ~ ❽) of the bottom of front panel.



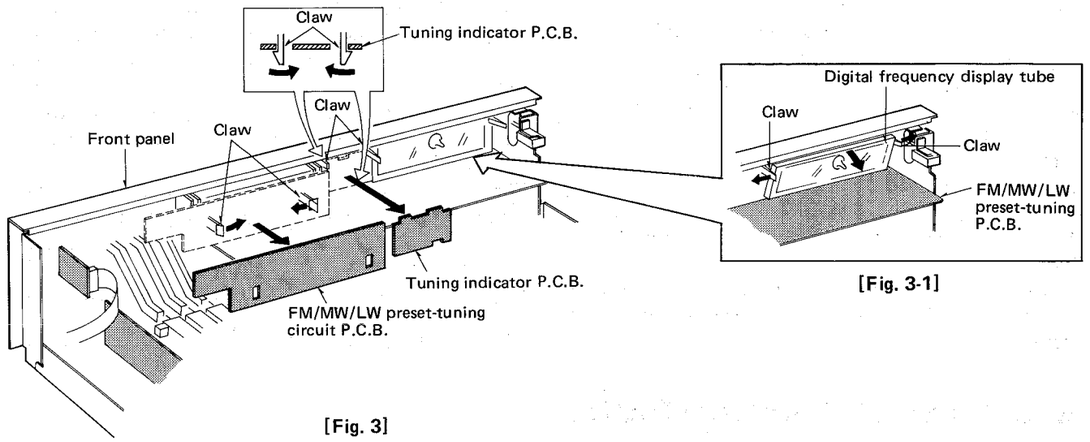
[Fig. 1]

4. Pull out the volume and balance control knobs (Fig. 2).



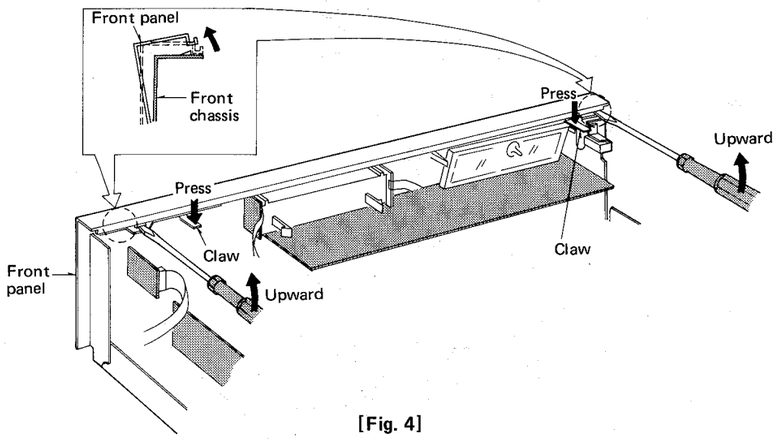
[Fig. 2]

5. Release the 2 claws which fasten the tuning indicator P.C.B. and remove the tuning indicator P.C.B. (The FM/MW/LW preset tuning circuit P.C.B. can be removed by releasing the 2 claws as in Fig. 3.)
   Next, release the 2 claws which secure the digital frequency display tube and then shift down the digital frequency display tube in the direction of the arrow as in Fig. 3-1.



[Fig. 3] [Fig. 3-1]

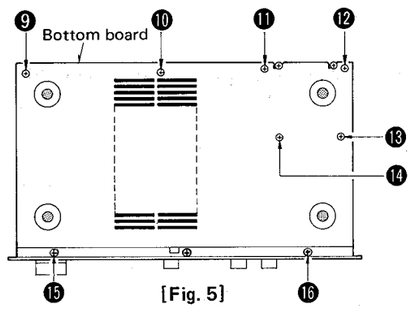
6. Insert a screwdriver between the front panel and front chassis while lightly pressing the claw and raise the screwdriver upward to remove the front panel. (See Fig. 4).



[Fig. 4]

- **How to remove the bottom board**

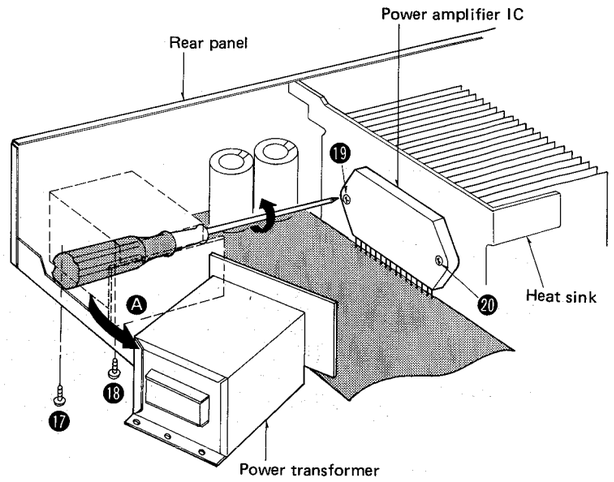
1. Remove the 8 setscrews (Fig. 5: ❾ ~ ⓰) of the bottom board.
2. Remove the bottom board.



[Fig. 5]

- **How to remove the power amplifier IC**

1. Remove the cabinet and bottom board.
2. Remove the 2 setscrews (Fig. 6: ⓱ , ⓲) to detach the power transformer from rear panel in the direction of arrow Ⓐ.
3. Unsolder of power IC.
4. Remove the 2 setscrews (Fig. 6: ⓳ , ⓴) used to secure the power IC on the heat sink, and then pull the power IC.
5. When mounting the power IC, apply silicone compound or equivalent heat diffuser to the rear side of power IC, and then follow the steps 1 ~ 4 reversely.



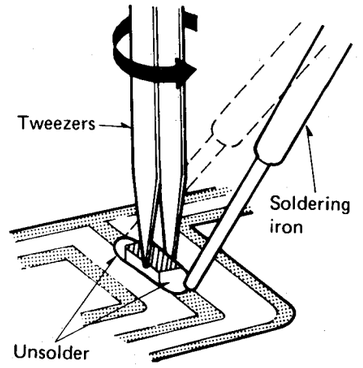
[Fig. 6]

- **How to replace chips (resistor)**

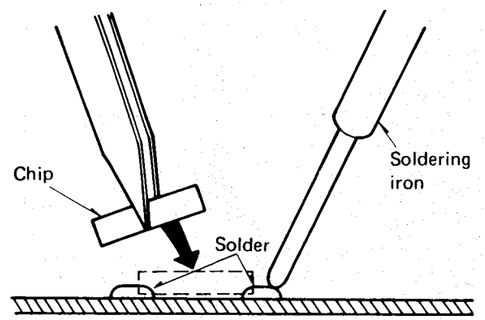
1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 7.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 8.

Notes:

1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.



[Fig. 7]



[Fig. 8]

- **Note for replacing chips**

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.

- **Precautions for repair**

When frequency is not indicated, FL (display tube), FL driver, digit circuit, and micro-computer must be checked by oscilloscope.
In this case, take care not to allow short circuit between IC terminals or application of voltage from measuring instrument to IC terminals.

ORDER NO. SD82082281C2

Service Manual

FM/AM Stereo Receiver

SA-323

[EGA]

SA-323(K)

[EGA]

Area

* [EGA] is available in F. R. Germany.

* The cabinet and front panel are available in black color and silver types.
* The black type model is provided with (K) in the service manual.

Please use this manual together with the service manual for Model No. SA-323
Order No. SD82052180C8

■ TECHNISCHE DATEN

Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 40W (4 Ω)
	2 × 35W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle ausgesteuert	2 × 40W (4 Ω)
	2 × 35W (8 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 40W (4 Ω)
	2 × 37W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 20 Hz ~ 20 kHz	0,03% (4 Ω)
	0,007% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,03% (4 Ω)
	0,007% (8 Ω)
Nennleistung bei 1 kHz	0,007% (4 Ω)
	0,007% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,007% (8 Ω)
halbe Nennleistung bei 1 kHz	0,001% (8 Ω)
−26 dB Leistung bei 1 kHz	0,08% (4 Ω)
50 mW Leistung bei 1 kHz	0,12% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,03%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,01%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	5 Hz ~ 40 kHz (4 Ω)
Dämpfungsfaktor	15 (4 Ω), 30 (8 Ω)
Frequenzgang	
Phono	RIAA-Standardkurve
	±0,8 dB (30 Hz ~ 15 kHz)
Aux, Tape	5 Hz ~ 70 kHz(−3 dB)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Aux	150 mV/22 kΩ
Tape 2	150 mV/22 kΩ
Tape 1 Aufnahme/Wiedergabe (TAPE 1 REC/PLAY)	180 mV/25 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschabstand	
Nennleistung (4 Ω)	
Phono	75 dB (nach IHF, A: 78 dB)
Aux, Tape 1, 2	88 dB (nach IHF, A: 95 dB)
−26 dB Leistung (4 Ω)	
Phono	64 dB
Aux, Tape 1, 2	66 dB
50 mW Leistung (4 Ω)	
Phono	62 dB
Aux, Tape 1, 2	62 dB
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Tiefenfilter	30 Hz, −6 dB/Okt.
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung)	50 Hz, +9 dB
Ausgangsspannung und -impedanz	
Tape 1/2 Aufnahme (TAPE 1, 2 REC OUT)	150 mV
Tape 1 Aufnahme/Wiedergabe (TAPE 1 REC/PLAY)	30 mV/82 kΩ
Kanalabweichung (Aux, 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	390 mV/330 Ω
Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,3 μV (75 Ω)
S/R 26 dB	1,2μV (75 Ω)
S/R 20 dB	0,9μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,5 μV (nach IHF '58)
Gesamtklirrfaktor	
Mono	0,08%
Stereo	0,15%
Geräuschabstand	
Mono	60 dB (78 dB nach IHF)
Stereo	58 dB (72 dB nach IHF)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender	
breit	±400 kHz, 65 dB
schmal	±300 kHz, 70 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	75 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	82 dB
AM-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−35 dB (−35 dB nach IHF)
38 kHz	−50 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9 kHz-Schritte) 530 ~ 1620 kHz (10 kHz-Schritte)
Eingangsempfindlichkeit (S/R 20 dB)	30 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 1000 kHz	40 dB
ZF-Dämpfung bei 1000 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	320 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 97 × 300 mm
Gewicht	7 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

■ MESSUNGEN UND JUSTIERUNGEN

AM (MW)-EINSTELLUNG

* **Stellungen und zu benutzende Geräte**
1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM).
2. AM (MW)-Meßsender (AM-SG).
3. Den Wellenbereichsschater auf die "AM"-Position sellen.
4. AM (MW) Wellenverteilungs-Wahlschalter auf Position "10 kHz step" stellen.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM(MW)-MESSENDER ANSCHLUSS	AM(MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERFAHREN
	MW-HF-ABGLEICH					
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenne-neingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	610 kHz (400 Hz Modulat., 30%)	610 kHz	Oszilloskop oder Wechselstrom-Voltmeter an Ausgangs-klemme (OUTPUT) Schließen.	T201 (Ant. Spule)	1. Auf max. Ausgang abgleichen. 2. Den Ferritkern von T201 mit einem Schraubendreher justieren.
2		1500 kHz (400 Hz Modulat., 30%)	1500 kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (1) und (2) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

* **Stellungen und zu benutzenden Geräte**
1. UKW-Meßsender (FM-SG).
2. Verzerrungsmesser
3. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM).
4. Signal frequenzmesser (meßar für 19 kHz und 108 MHz).
5. UKW 75-Ohm Kunstantenne.
6. Den Wellenbereichsschater auf die "FM"-Position sellen.
7. Den Sendersuchlauf-/UKW-Betriebsarten schalter auf "off (manual)/ mono"-Position sellen.
8. Die anderen Einstellungen sind gleich wie beider MW-Justierung.

* **Vorbereitung UKW-Massender (FM-SG)**
1. SG-Ausgang über 75-Ohm UKW Kunstantenne an den Antenneneingang des Gerätes schließen.
2. Der normale Eingang des Gerätes beträt 60 dB (1mV), 400 Hz 100% Modulation. (Wegen Verwendung der Kunstantenne muß der Signalausgang 12 dB plus (IHF) sein; d.h. beim Eingang von 60 dB soll der Signalausgang 72 dB sein.)

Nr.	FM(UKW)-MESSENDER ANSCHLUSS	FM(UKW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERFAHREN
	UKW-ZF-ABGLEICH					
3	———	Kein Signal	100.10 MHz	Ein Gleichstromröhren-voltmeter zwischen TP101 und TP102 über eine Drosselspule verbinden. (Siehe Abb. 10)	T101 (Diskriminator FT)	1. Den Kern von T101 so justieren, daß die gemessene Spannung im signallosen Modus 0 mV im 300 mV Bereich beträgt.

Nr.	FM(UKW)-MESSENDER ANSCHLUSS	FM(UKW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERFAHREN
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
4	Meßsender über eine Kunstantenne an den UKW-Antennen-eingang schließen. (60 dB in den Antenneneingang leiten.)	100.10 MHz (400 Hz Modulat., 100%)	100.10 MHz	Oszilloskop über den Lautsprecher schließen.	T102 (Diskriminator FT)	1. Schritt (3) überprüfen und, falls Abweichung vorhanden, T101 erneut justieren. 2. T102 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.
	UKW-MPX-PILOTABGLEICH (VCO)					
5	Meßsender über eine Kunstantenne an den UKW-Antennen-eingang schließen. (Mono-Signal)	100.10 MHz (modulierte Welle)	100.10 MHz	Den Signalfrequenz-messer durch 100kΩ Widerstand an Anschluß TP301 anschließen.	VR301 (VCO)	1. Den Sendersuchlauf-/UKW-Betriebsartenschalter auf "on/auto"-Position sellen. 2. VR301 so abgleichen, daß Ausgangsfrequenz von TP301 19 kHz ± 30 Hz.
	JUSTIERUNG DES STEREO-AUGES					
6	Meßsender über eine Kunstantenne an den UKW-Antenneneing-ang schließen. (12 dB in den Antenneneingang leiten.)	100.10 MHz (400 Hz Modulat., 100%)	100.10 MHz	———	VR101 (Stereo-Auge-Pegeljustierung)	1. Den Sendersuchlauf-/UKW-Betriebsartenschalter auf "on/auto"-Position sellen. 2. VR101 so justieren, daß das Stereo-Auge aufleuchtet. 3. Überprüfen, daß das Stereo-Auge erlöscht, wenn die Eingangsleistung vom SG abgesenkt wird, und aufleuchtet, wenn die Eingangsleistung vom SG 12 dB beträgt.

VERSTÄRKERJUSTIERUNG

* Vor der Abstimmung VR601 und VR602 bis zum Anschlag entgegen dem Uhrzeigersinn drehen.
* Einstellung der zu benutzenden Regler und Instrumente.
1. Lautsprecherschalter . . . . . Hauptlautsprecher (main).
2. Lautstärke . . . . . "0" (Minimalstellung).
3. Gleichstromvoltmeter . . . . . 5 mV Meßbereich erforderlich.

Nr.	Einstellungen	Gleichstromvoltmeter-verbindungen	Einstellungspunkte	Einstellungsvorgang
7	Icq	L-Kanal Zwischen TP601 und TP603 (Minustest) R-Kanal Zwischen TP602 und TP604 (Minustest)	VR601 (L-Kanal) VR602 (R-Kanal)	* VR601 (L-Kanal) und VR602 (R-Kanal) auf ungefähr 20 mV, nach 10 Minuten Anwärmezeit, einstellen.

CHANGES

■ REPLACEMENT PARTS LIST

Notes: 1. Mentioned in this parts list are only those changed in Model No. SA323 (Order No. SD82052180C8) for destination [EX].

Ref. No.	Change of Part No. SA-323/(K) [EX] → SA-323/(K) [EGA]		Description	Per Set (Pcs.)	Remarks
COILS					
L81 ~ 84	Addition	ELQS181KB	Choke	4	
L101	SLM1C61–P	SLM1C71–P	Filter	1	
L290, 291	Addition	RLQY15G5–Y	Choke	2	
L750, 751	Addition	SLQX400–D	Choke	2	
SWITCH					
S701	ESB822S	ESB90619S	Power	1	

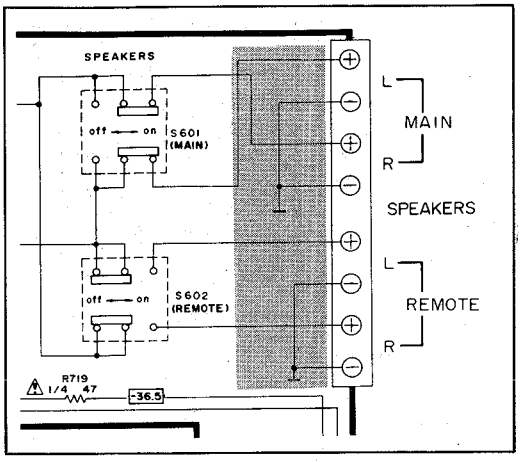
Ref. No.	Change of Part No. SA-323/(K) [EX] → SA-323/(K) [EGA]		Description	Per Set (Pcs.)	Remarks
VARIABLE RESISTOR					
VR101	Addition	EVNM4AA00B23	Stereo Eye Level Adjustment	1	
RESISTORS					
R61	ERDS1FJ823	Deletion	.....	0	
R62	ERDS1FJ273	Deletion	.....	0	
R81, 82	Addition	ERD25FJ391	390Ω, Carbon, 1/4W	2	
R83, 84	Addition	ERD25FJ272	2.7kΩ, Carbon, 1/4W	2	
R85, 86	Addition	ERD25TJ104	100kΩ, Carbon, 1/4W	2	
R89, 90	Addition	ERD25FJ332	3.3kΩ, Carbon, 1/4W	2	
R91, 92	Addition	ERD25FJ122	1.2kΩ, Carbon, 1/4W	2	
R304	ERD25TJ394	ERD25TJ274	270kΩ, Carbon, 1/4W	1	
R307, 308	ERD25FJ332	ERD25FJ392	3.9kΩ, Carbon, 1/4W	2	
CAPACITORS					
C81, 82	Addition	ECCD1H180K	18pF, Ceramic, 50V	2	
C90 ~ 92	Addition	ECKD1H102ZF	0.001μF, Ceramic, 50V	3	
C93	Addition	ECCD1H560KC	56pF, Ceramic, 50V	1	
C290	Addition	ECKD1H102ZF	0.001μF, Ceramic, 50V	1	
C307, 308	ECQM1H153JZ	ECQM1H223JZ	0.022μF, Polyester, 50V	2	
C509, 510	ECCD1H390K	ECCD1H101K	100pF, Ceramic, 50V	2	
C651, 652	Addition	ECKD1H103ZF	0.01μF, Ceramic, 50V	2	
C653, 654	Addition	ECKD1H223ZF	0.022μF, Ceramic, 50V	2	
C655	Addition	ECKD1H103ZF	0.01μF, Ceramic, 50V	1	
C661, 662	Addition	ECKD1H223ZF	0.022μF, Ceramic, 50V	2	
C716	Addition	ECQE1104KN	0.1μF, Polyester, 100V	1	
C730	ECKD1H223ZF	Deletion	.....	0	
C914	Addition	ECEA1HS100	10μF, Electrolytic, 50V	1	
FM FRONT END					
	SNVFE306E05	SNVFE306G05	FM Front End Pack	1	
CABINET and CHASSIS PARTS					
16	SJF8037–3N	SJF8037–9N	Terminal, IN/OUTPUT	1	
17	SGP3010–7A	SGP3010–9A	Rear Panel	1	
20	SJA88	SJA153	AC Cord	1	
35	Addition	SMX681	Cover	2	
36	Addition	SJS9105	Terminal, FM Antenna	1	
SCREWS					
N13	Addition	XTBS3+8BFZ1	Tapping with Detent	6	
ACCESSORIES					
A1	SQF11233	SQF11235	Instruction Book	1	
A2	SSA267	Deletion	.....	0	

■ CHANGE OF SCHEMATIC DIAGRAM

- **Speakers terminal circuit**

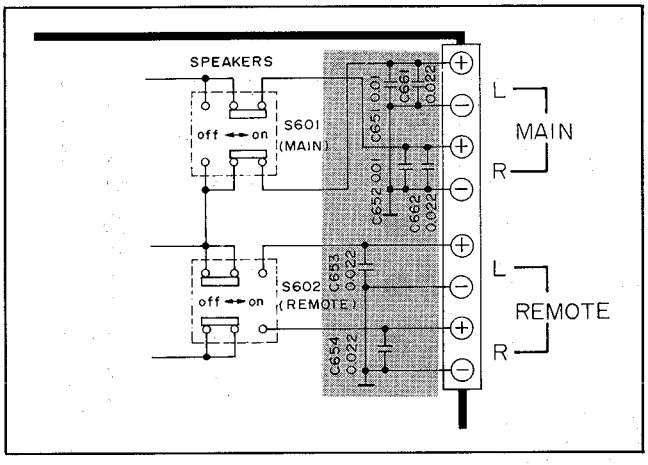
1. Addition of C651, C652, C653, C654, C657, C658, C659 and C660.

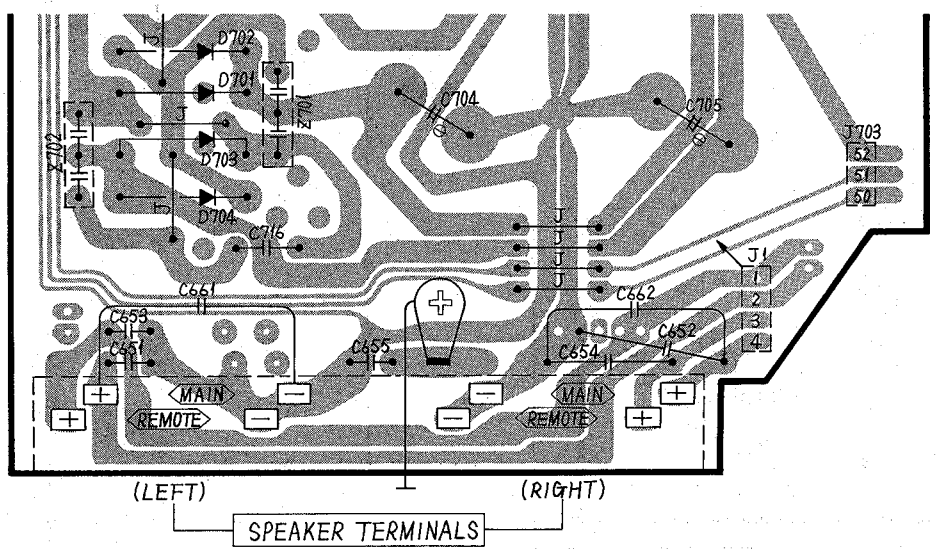
SA-323 [EX]



CHANGE

SA-323 [EGA]

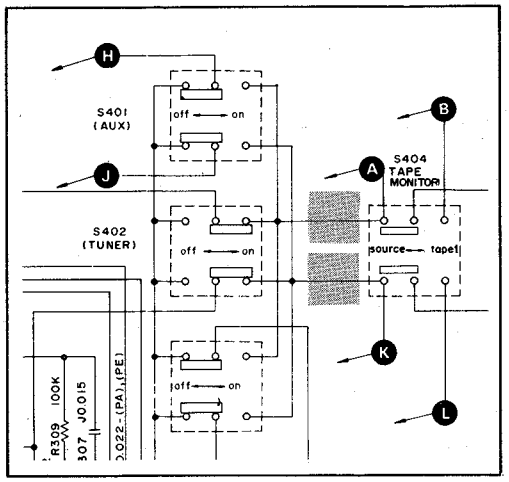




- **Input selector circuit**

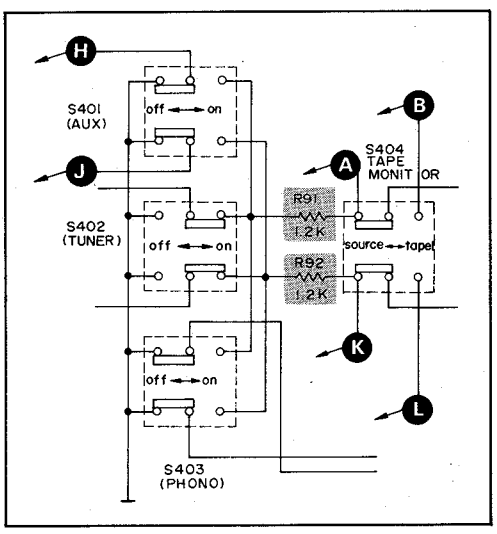
1. Addition of R91 and R92.

SA-323 [EX]



CHANGE

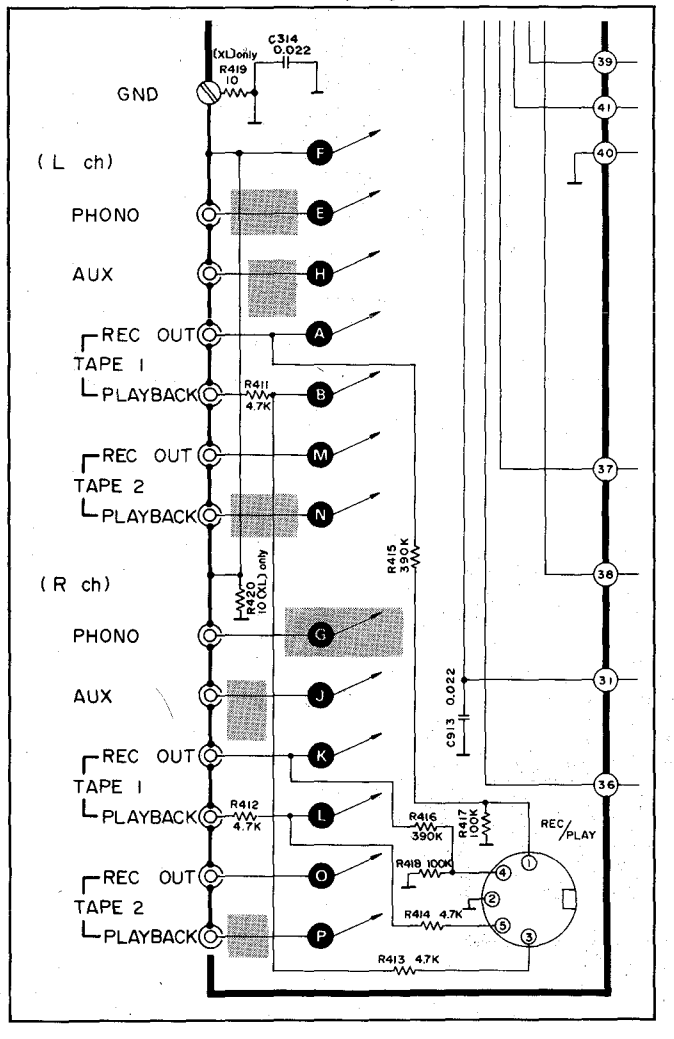
SA-323 [EGA]



- **Input terminal circuit**

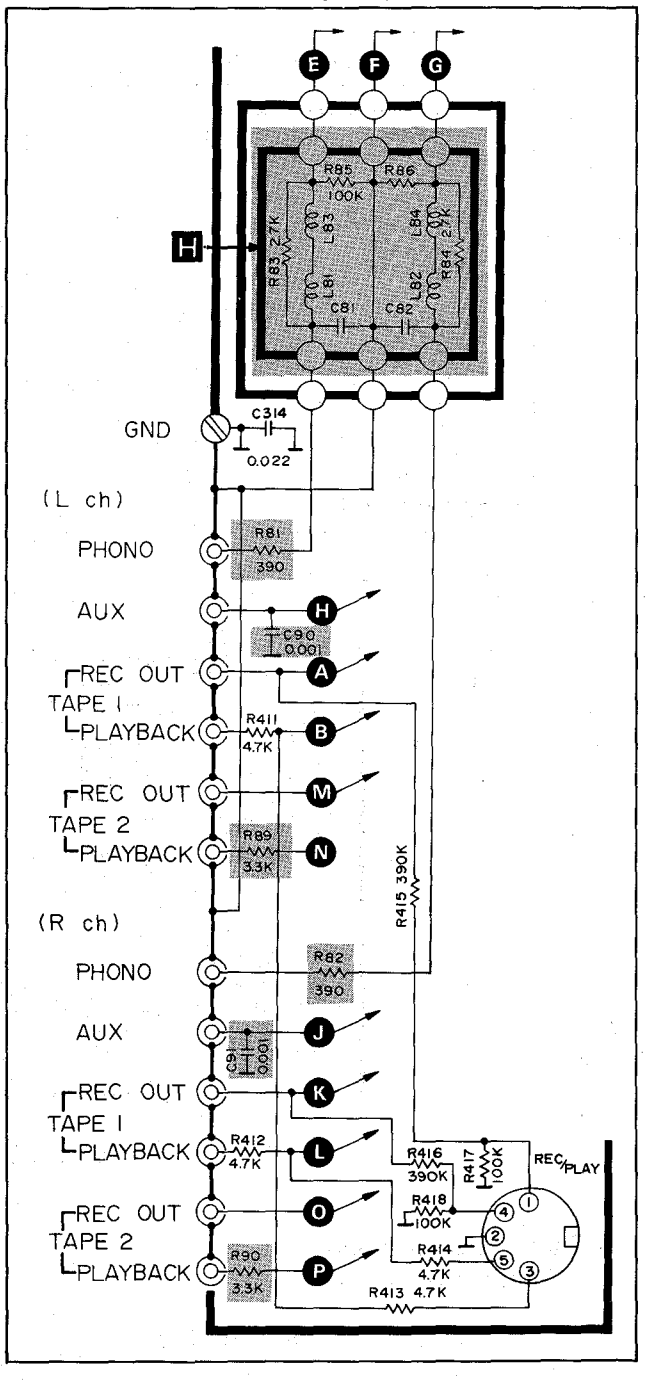
1. Addition of R81, R82, R89, R90, C90 and C91.
2. Addition of P.C.B. H.

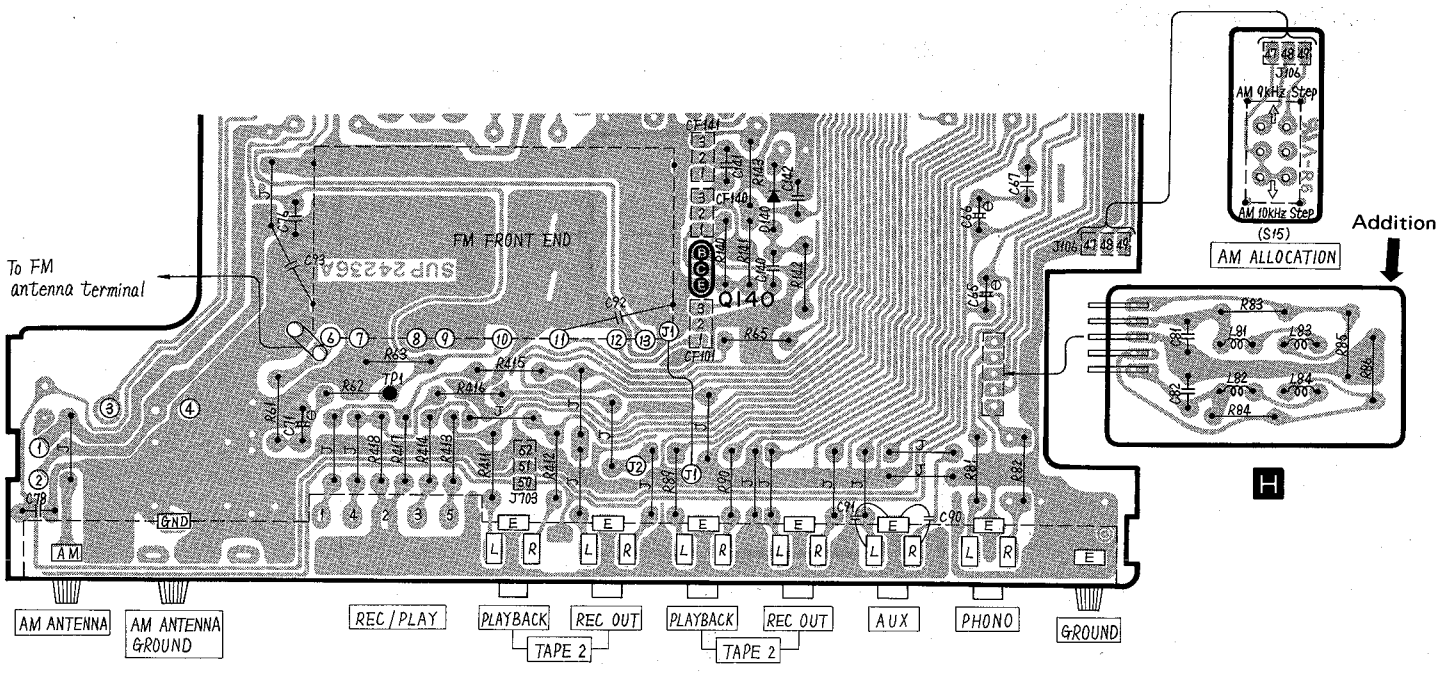
SA-323 [EX]



CHANGE

SA-323 [EGA]

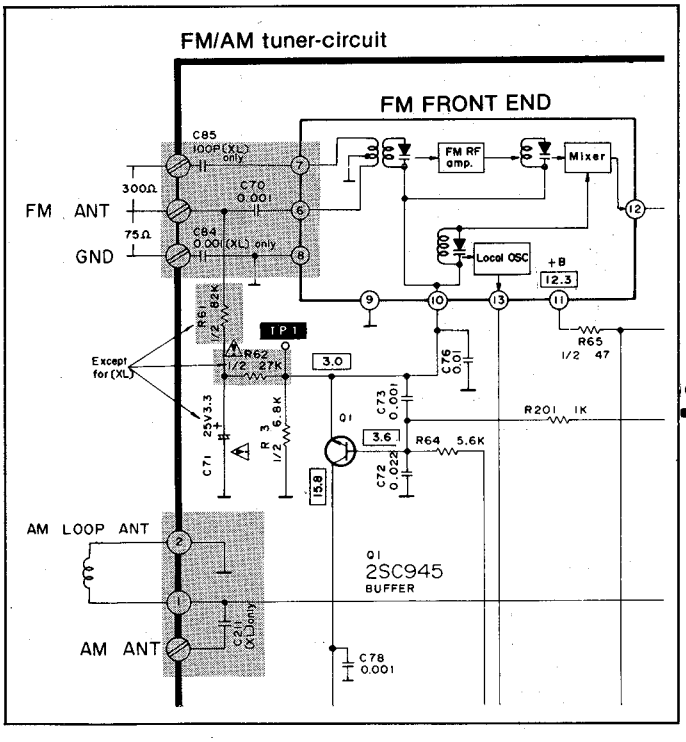




- **FM/AM tuner-circuit**

1. Deletion of 300Ω FM antenna terminal.
2. Addition of P.C.B. G

SA-323 [EX]



CHANGE

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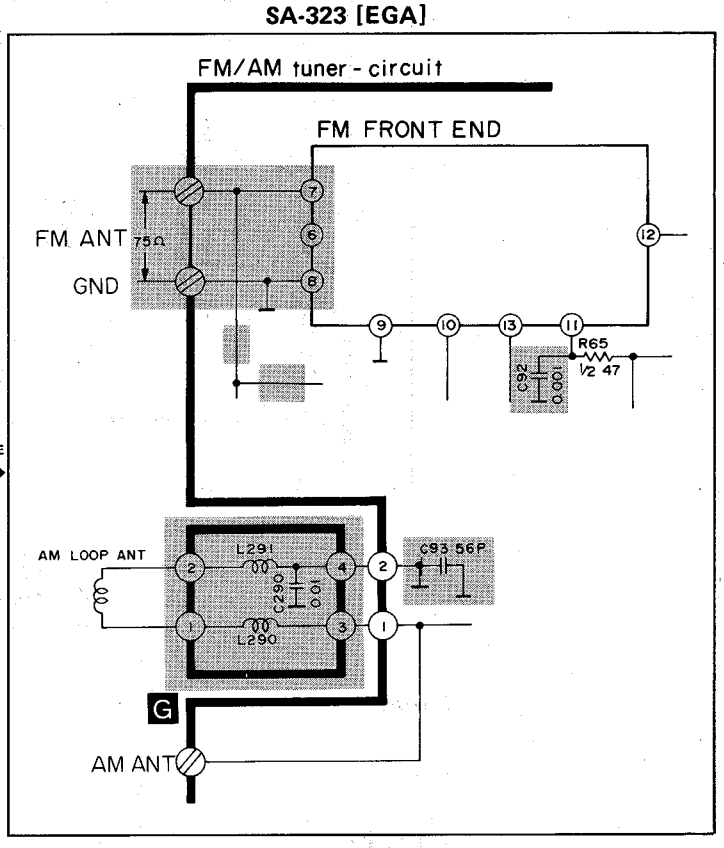
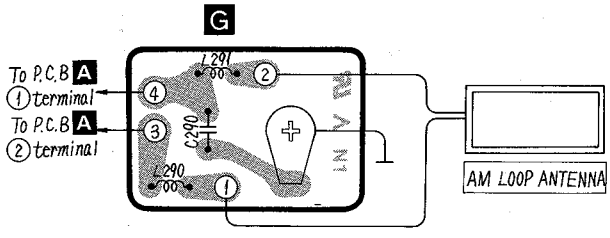


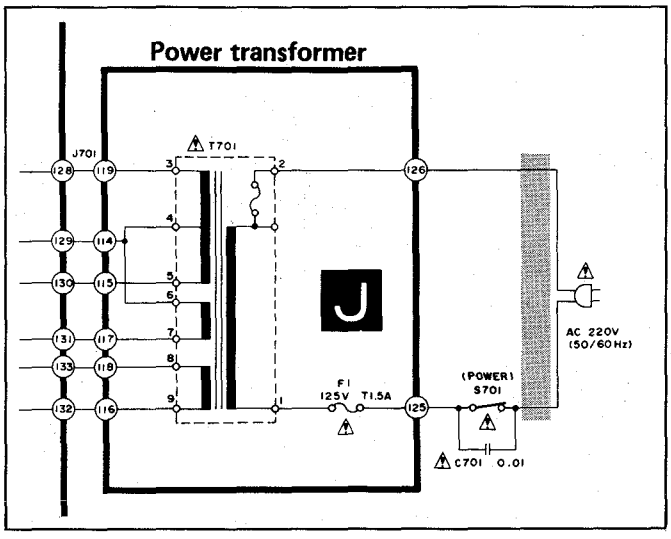


SA-323

- **Power supply circuit**

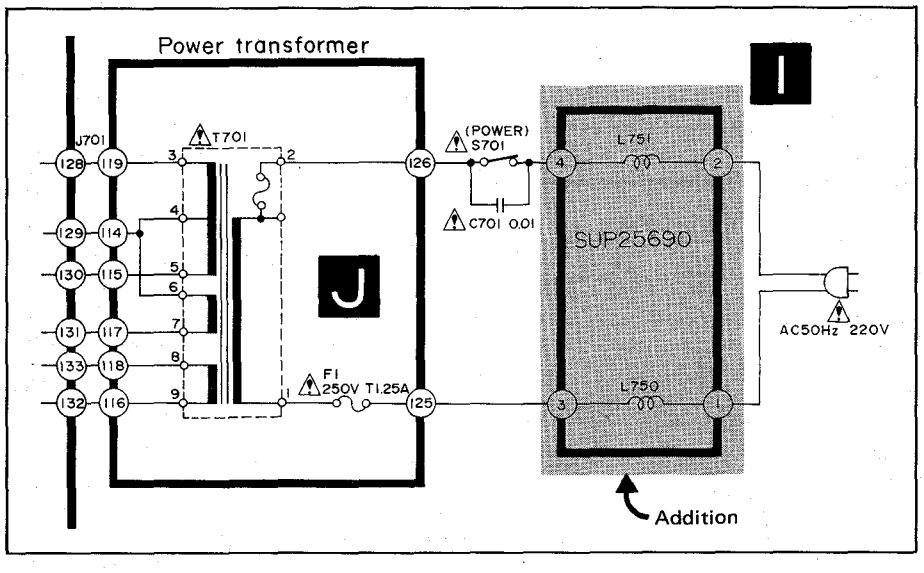
1. Addition of P.C.B. I.

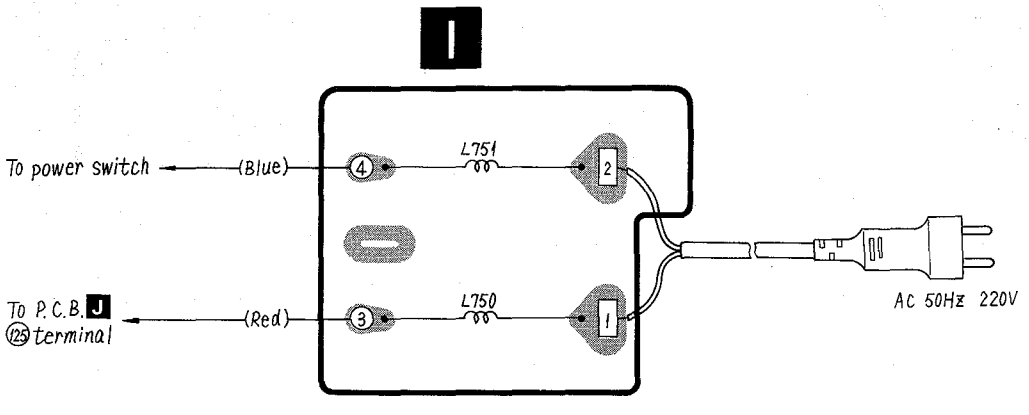
SA-323 [EX]



CHANGE

SA-323 [EGA]





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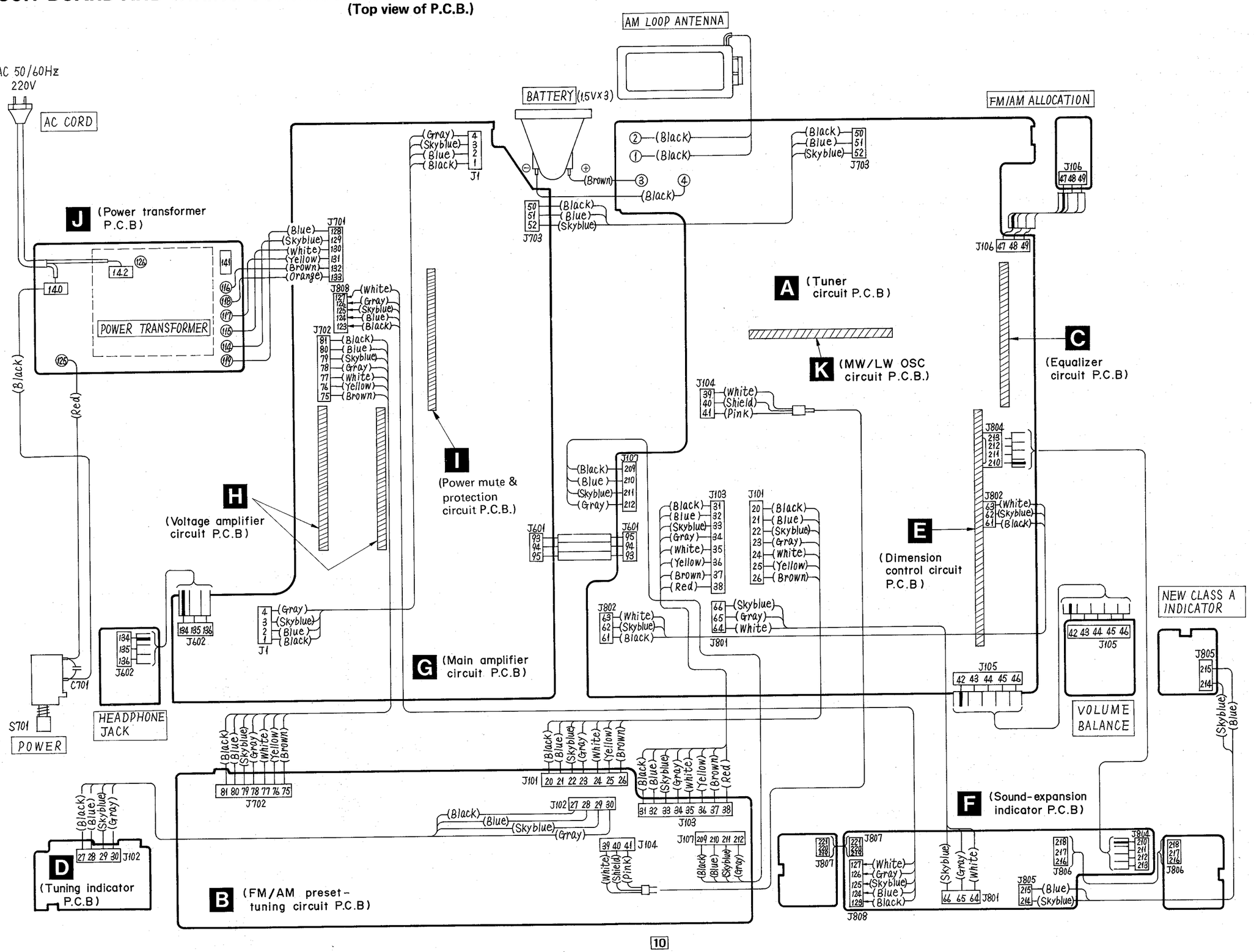
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

(Top view of P.C.B.)



■ MEASUREMENTS AND ADJUSTMENTS

Note: AM IFT (T202) and Filter (L101) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

• Setting and Equipment used

1. AC and DC electronic voltmeters (VTVM)
2. Oscilloscope
3. AM signal generator (AM-SG)
4. Set input selector to "tuner" position.
5. Set band selector to MW (MW adjustment) or LW (LW adjustment) position.
6. Set MW allocation selector to "10 kHz step" position.
7. Maintain line voltage at rated volts.
8. Output of signal generator should be no higher than necessary to obtain an output reading.
9. Use a non-metal screwdriver for the adjustment.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	MW-RF ADJUSTMENT *Set band selector to "MW" position.					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	530 kHz (30% Mod. with 400 Hz)	530 kHz	Connect DC VTVM to TP202 terminal	L252 (OSC coil)	1. Adjust L252 so that voltage measured by DC voltmeter is 1.1 ±0.2V.
2		610 kHz (30% Mod. with 400 Hz)	610 kHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	T201 (ANT coil)	1. Adjust for maximum output. 2. Adjust core of T201 by screwdriver.
3		1500 kHz (30% Mod. with 400 Hz)	1500 kHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	CT201 (ANT trimmer)	1. Adjust for maximum output. 2. Repeat steps (2) and (3) until the frequency correctly matches the display.
	LW-RF ADJUSTMENT *Set band selector to "LW" position.					
4	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	155 kHz (30% Mod. with 400 Hz)	155 kHz	Connect DC VTVM to TP202 terminal.	L251 (OSC coil)	1. Adjust L251 so that voltage measured by DC voltmeter is 1.0 ±0.2V.
5		155 kHz (30% Mod. with 400 Hz)	155 kHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	T203 (ANT coil)	1. Adjust for maximum output. 2. Adjust core of T203 by screwdriver.
6		353 kHz (30% Mod. with 400 Hz)	353 kHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	CT202 (ANT trimmer)	1. Adjust for maximum output. 2. Repeat steps (5) and (6) until the frequency correctly matches the dial display.

FM ADJUSTMENT

• Setting and Equipment used

1. FM signal generator (FM-SG)
2. Distortion analyser.
3. DC electronic voltmeters (VTVM).
4. Frequency counter (19 kHz and 108 MHz and measurable)
5. FM 300Ω dummy antenna (Fig. 9) and low-pass filter. (fc: 15 kHz ~ 19 kHz)
6. Set band selector to "FM" position.
7. Set Auto scan/FM mode selector to off "(manual)/FM mono" position.
8. Other setting are the same as in AM adjustment.

• Preparation of FM signal generator (FM-SG)

1. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
2. The standard input of the set is 60 dB (1 mV), 400 Hz 100% modulation (Because of using dummy antenna, SG output must be 12 dB plus (IHF). That is, when input 60 dB, SG output is to be 72 dB.)

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM-IF ADJUSTMENT					
7	————	No-Signal	100.1 MHz	Connect DC VTVM to between TP101 and TP102 through choke coil. (Refer to Fig. 10)	T101 (Discri. IFT)	Adjust T101 core so that voltage measured in signal mode is 0 mV in 300 mV range.
	FM MONO DISTORTION ADJUSTMENT					
8	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Apply 60 dB to antenna terminal)	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect distortion analyser to "Speaker" terminals of the set.	T102 (Discri IFT)	1. Check step (7) in no signal mode. 2. If it is deflected, readjust of T101. 3. Adjust T102 core so that distortion of right and left channels are minimized.
	FM MPX PILOT (VCO) ADJUSTMENT					
9	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Apply 60 dB to antenna terminal)	100.1 MHz (Non-modulated)	100.1 MHz	Connect frequency counter to TP301 terminal through resistor. (100kΩ).	VR301 (VCO)	1. Set the Auto scan/FM mode selector to "on/FM auto" position. 2. Adjust VR301 to 19 kHz ±30 Hz.

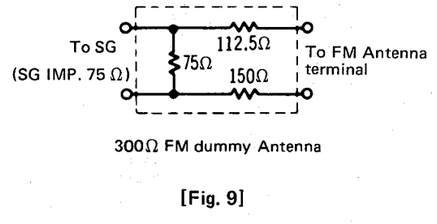
AMPLIFIER ADJUSTMENT

*** Setting of controls and instruments to be used.**

* Before the adjustment, VR601 and VR602 should be turned to counter-clockwise direction.

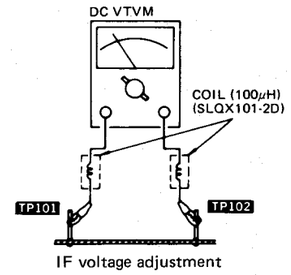
1. Main speaker switch . . . . . .off
2. Remote speaker switch. . . . . .off
3. Sound volume. . . . . .0 (minimum)
4. DC voltmeter (capable to reasure 5 mV)
5. Dimension on/off switch. . . . .off

No.	ADJUSTMENTS	DC VOLTMETER CONNECTION	PARTS ADJUSTED	ADJUSTING PROCEDURE
10	Adjustment of Icq	(L channel) Between TP601 and TP603 (minus probe) (R channel) Between TP602 and TP604 (minus probe)	VR601 (L channel) VR602 (R channel)	Adjust VR601 (L ch.) and VR602 (R ch.) to approx. 20 mV after one minute warm-up time.



300Ω FM dummy Antenna

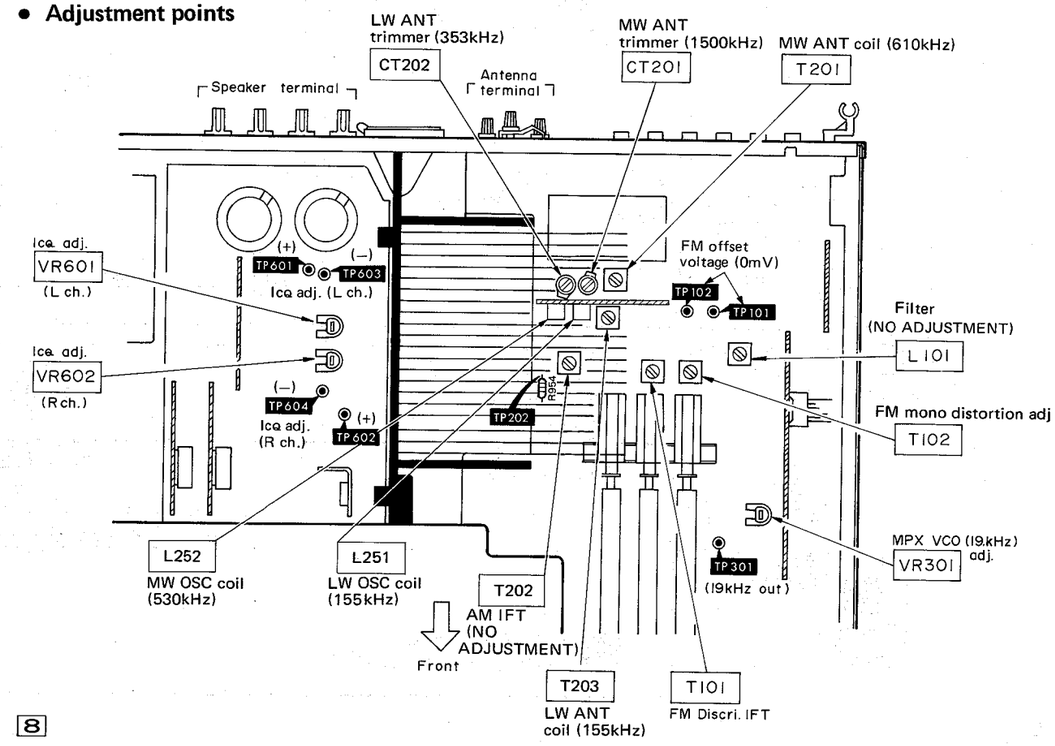
[Fig. 9]



IF voltage adjustment

[Fig. 10]

• Adjustment points



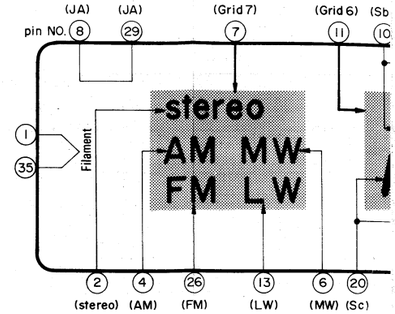
■ PRINTED CIRCUIT BOARD

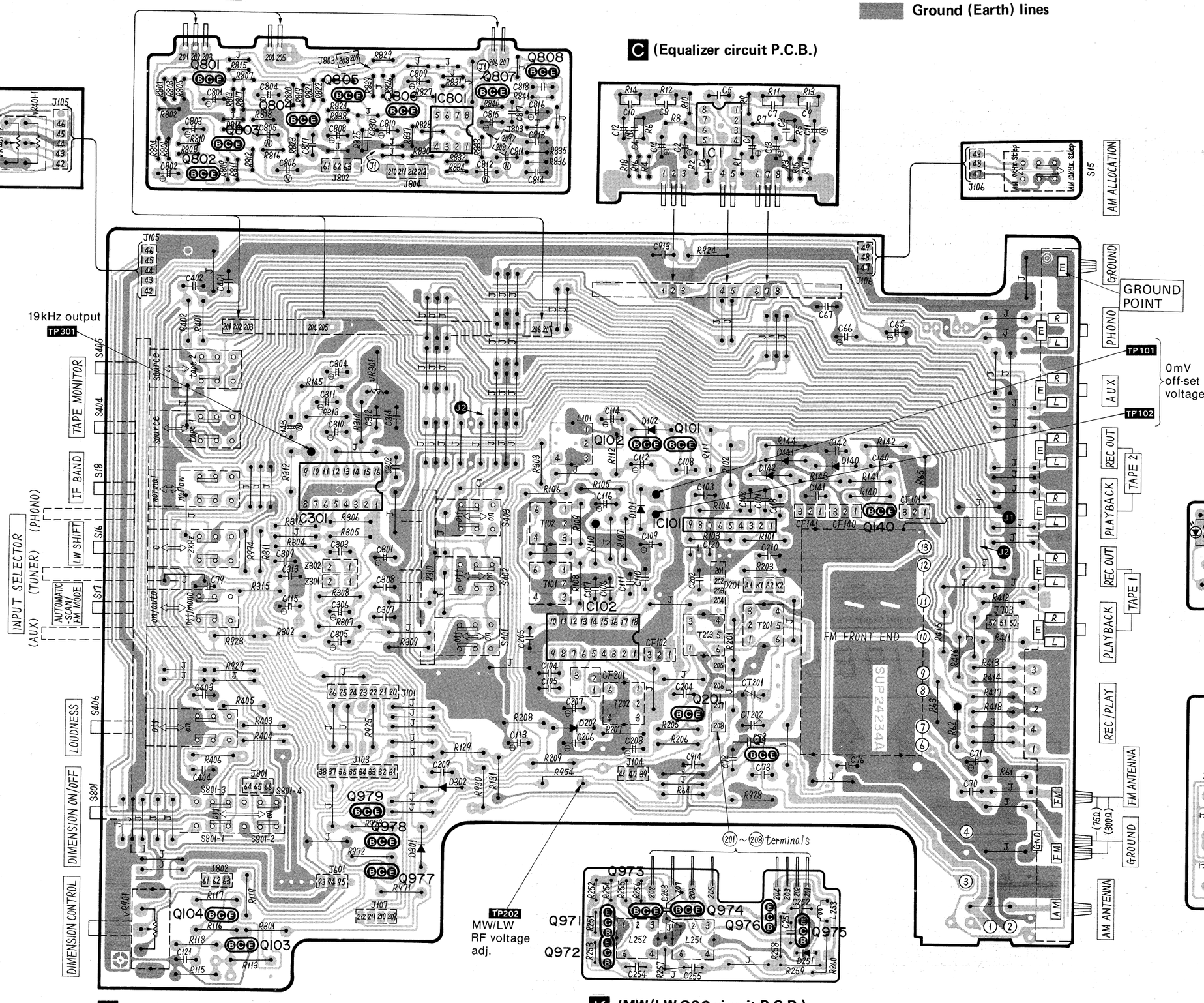
E (Dimension control circuit P.C.B.)

Ground (Earth) lines

C (Equalizer circuit P.C.B.)

• Digital frequency display tube (FL





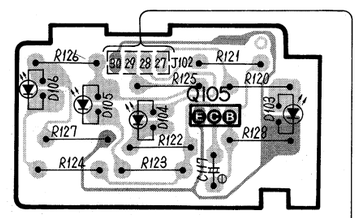
A (FM/MW/LW tuner circuit P.C.B.)

K (MW/LW OSC circuit P.C.B.)

11 12

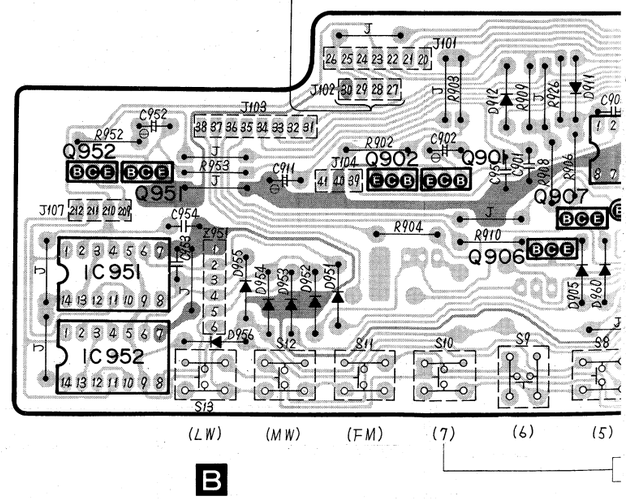
(Tuning indicator P.C.B.)

D



SOUND-EXPANSION INDICATOR (Lch)

F (



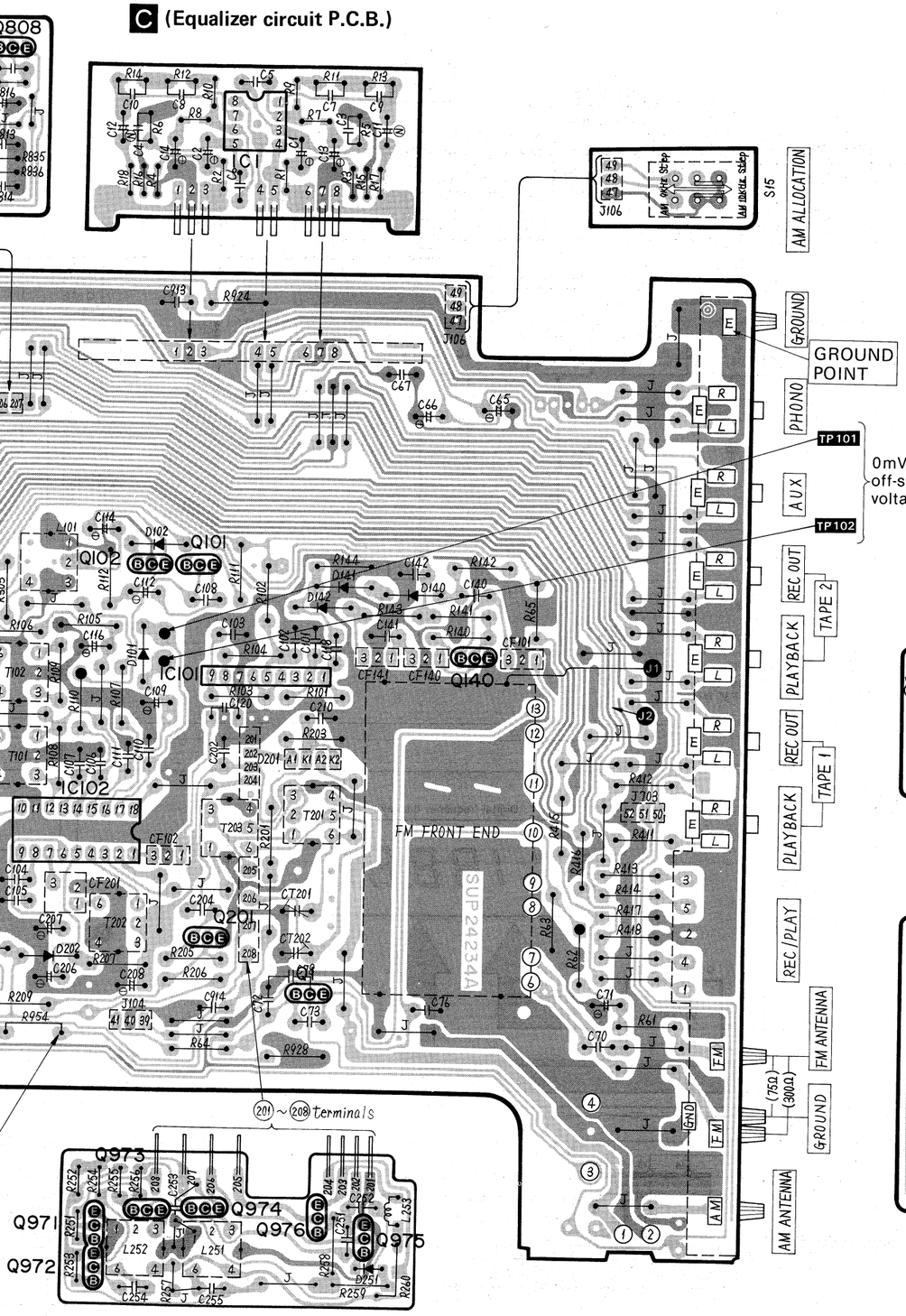
B

(FM/MW/LW preset-tuning circuit P.C.B.)

SA-323L

Ground (Earth) lines

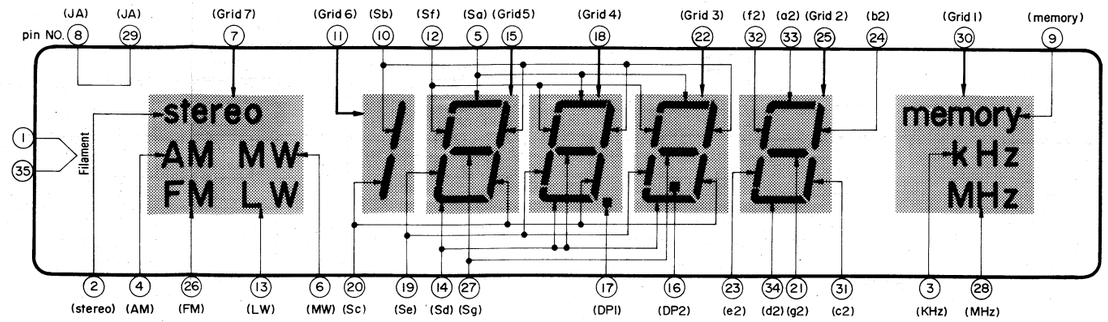
C (Equalizer circuit P.C.B.)



K (MW/LW OSC circuit P.C.B.)

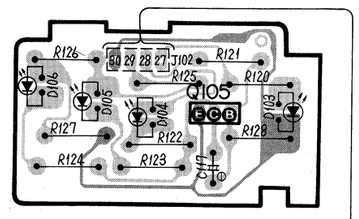
11 12

• Digital frequency display tube (FL) SAD7MT29ZA

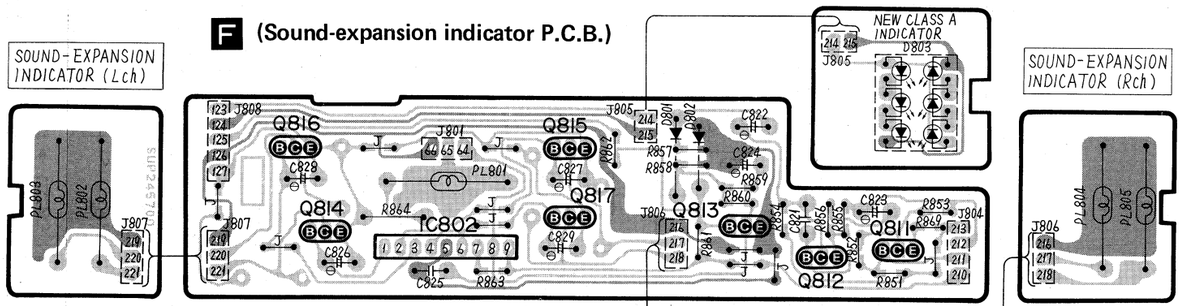


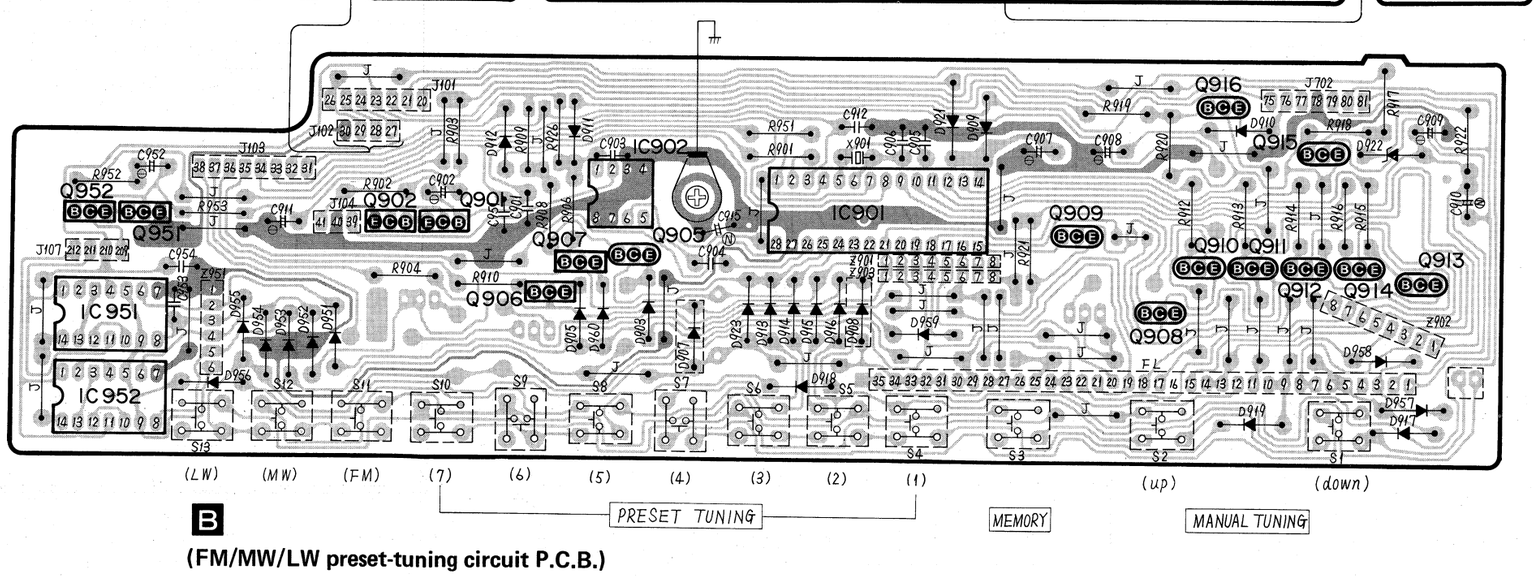
(Tuning indicator P.C.B.)

D



F (Sound-expansion indicator P.C.B.)

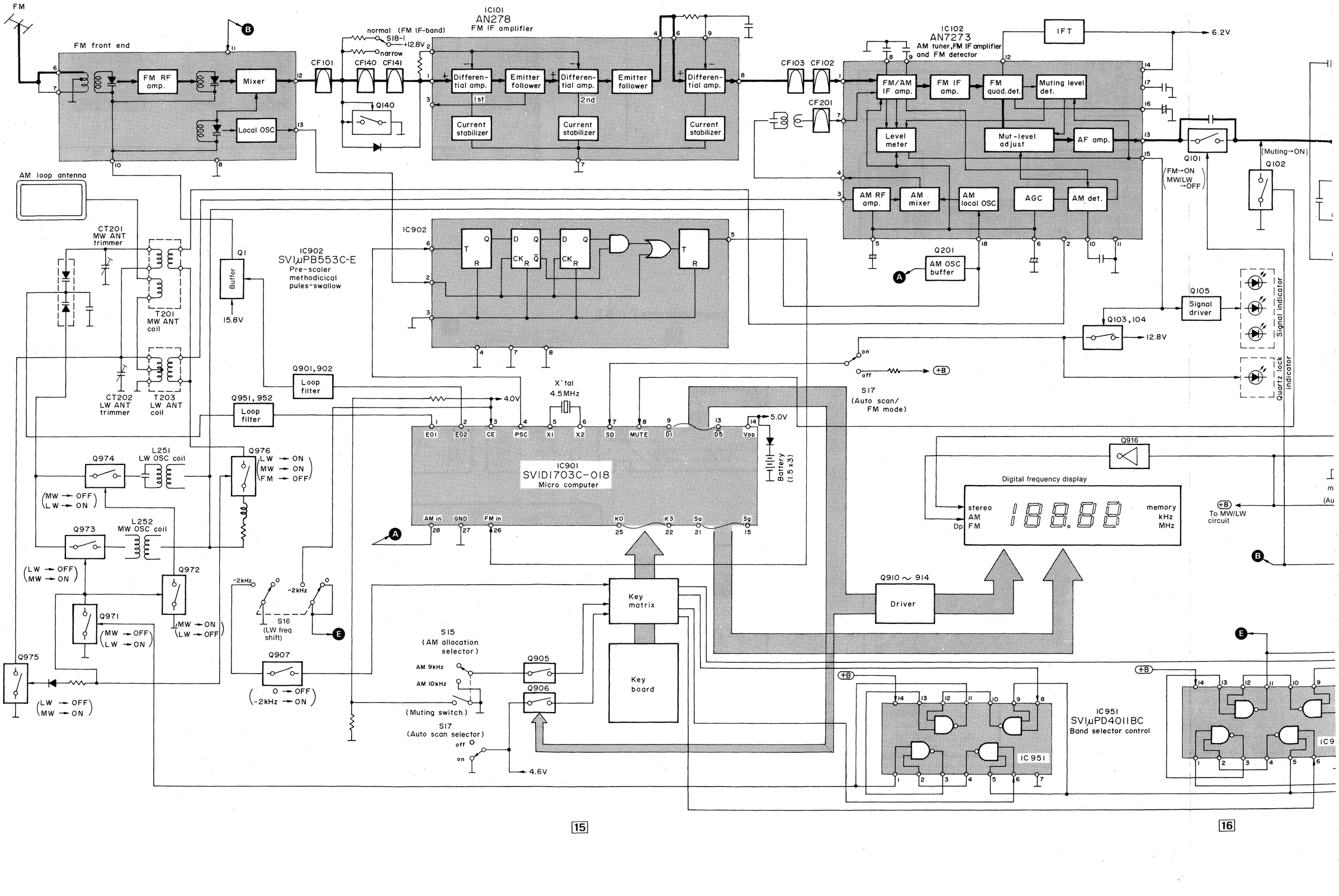




B (FM/MW/LW preset-tuning circuit P.C.B.)

■ BLOCK DIAGRAM

(FM/MW/LW tuner circuit and FM/MW/LW preset-tuning circuit)



IC101
AN278
FM IF amplifier

Differen-tial amp. (1st) → Emitter follower → Differen-tial amp. (2nd) → Emitter follower → Differen-tial amp.
Current stabilizer ×3

CF103 CF102 CF201

IC102
AN7273
AM tuner, FM IF amplifier and FM detector

IFT → 6.2V

FM/AM IF amp. → FM IF amp. → FM quad. det. → Muting level det.
Level meter
Mut-level adjust → AF amp.
AM RF amp. → AM mixer → AM local OSC → AGC → AM det.

Q101 (FM→ON MW/LW→OFF)
Q102 (Muting→ON)

Q201 AM OSC buffer

Q105 Signal driver → Signal indicator

Q103, 104 → 12.8V

Quartz lock indicator

IC301
AN7470
FM IF multiprex

AF amp. → MPX → Output amp. → De-emphasis → L channel
Output amp. → De-emphasis → R channel
(To input selector (S402))

S18-2 (FM IF-band) normal / narrow

Stereo switch
Pilot det.
Phase det.
Divider (19kHz)
Stereo/monaural control
VCO (76kHz)
Divider (38kHz)
Filter
12.3V
VR301 (VCO adj.)

Q915 Stereo ind. Driver

4.0V
X'tal 4.5MHz
5.0V
Battery (1.5×3)

IC901
SVIDI703C-018
Micro computer

CE2 CE PSC X1 X2 SD MUTE DI D5 Vpp
ND FM in KO K3 Sa Sg
27 26 25 22 21 15

S17 (Auto scan/FM mode)
on / off → +B

Q916

Digital frequency display
stereo / AM / FM / Dp
memory / kHz / MHz

auto / mono — S17 (Auto scan/FM mode) → +B
(FM→OFF MW→ON LW→ON)
Q979
+B To MW/LW circuit

Q978 (FM→ON MW→OFF LW→OFF) → +B

Q977 (FM→ON MW→OFF LW→OFF)

Key matrix
Key board
Q910 ~ 914 Driver

Q905
Q906

IC951
SVIμPD4011BC
Band selector control

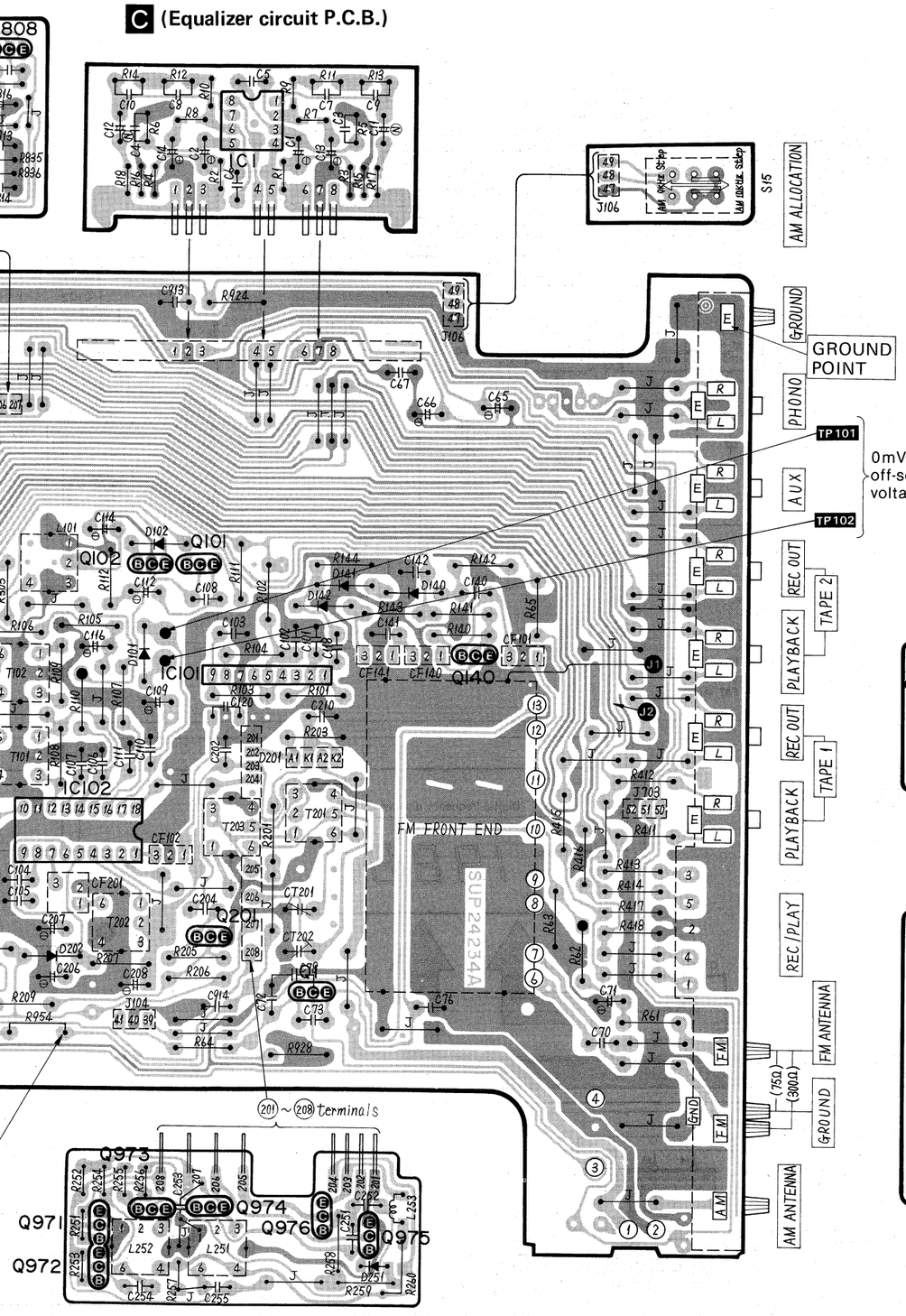
IC952
SVIμPD4011BC
Band selector control

4.6V

SA-323L

Ground (Earth) lines

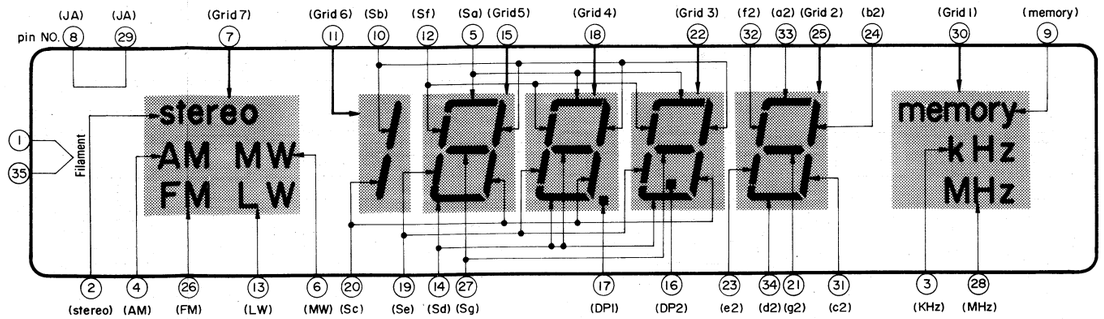
C (Equalizer circuit P.C.B.)



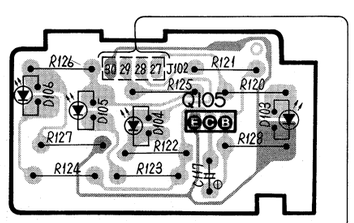
K (MW/LW OSC circuit P.C.B.)

11 12

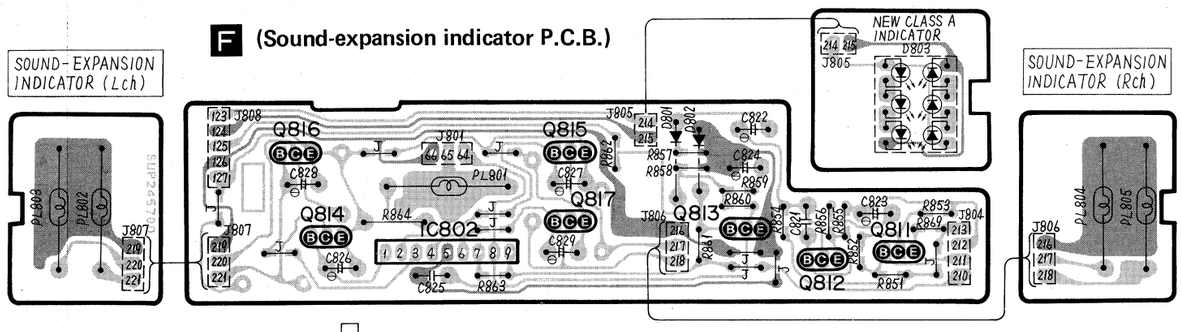
• Digital frequency display tube (FL) SAD7MT29ZA


pin NO.
(JA) (JA) (Grid 7) (Grid 6) (Sb) (Sf) (Sa) (Grid 5) (Grid 4) (Grid 3) (f2) (a2) (Grid 2) (b2) (Grid 1) (memory)
8 29 7 11 10 12 5 15 18 22 32 33 25 24 30 9
1
35
Filament
stereo
AM MW
FM LW
memory
kHz
MHz
2 4 26 13 6 20 19 14 27 17 16 23 34 21 31 3 28
(stereo) (AM) (FM) (LW) (MW) (Sc) (Se) (Sd) (Sg) (DPI) (DP2) (e2) (d2) (g2) (c2) (KHz) (MHz)

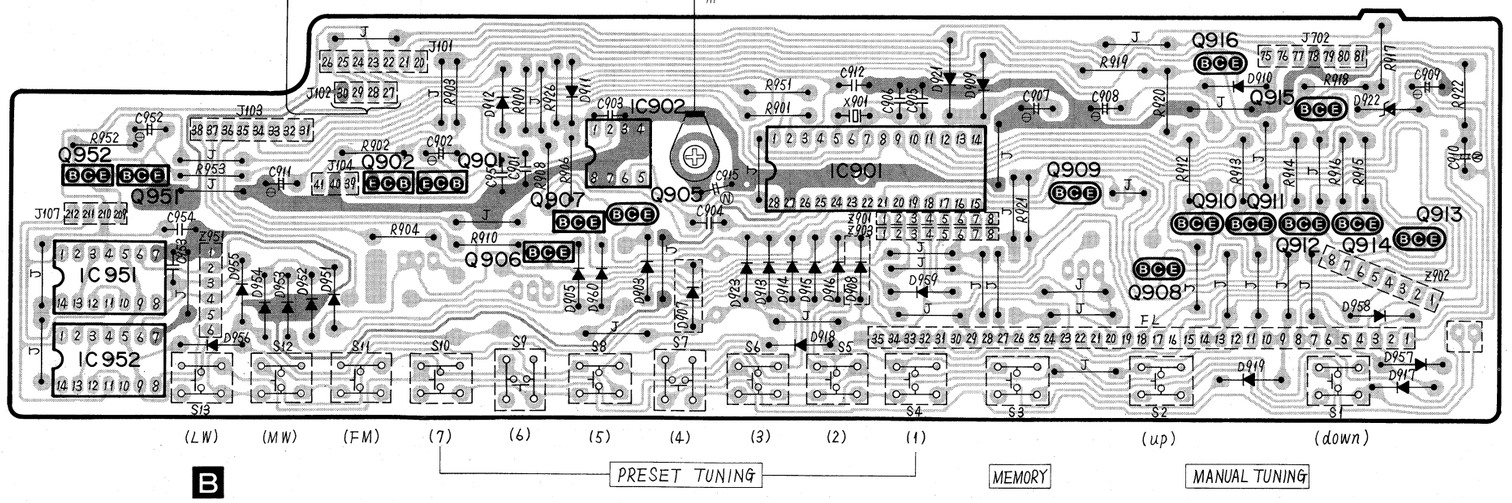
(Tuning indicator P.C.B.) D



F (Sound-expansion indicator P.C.B.)

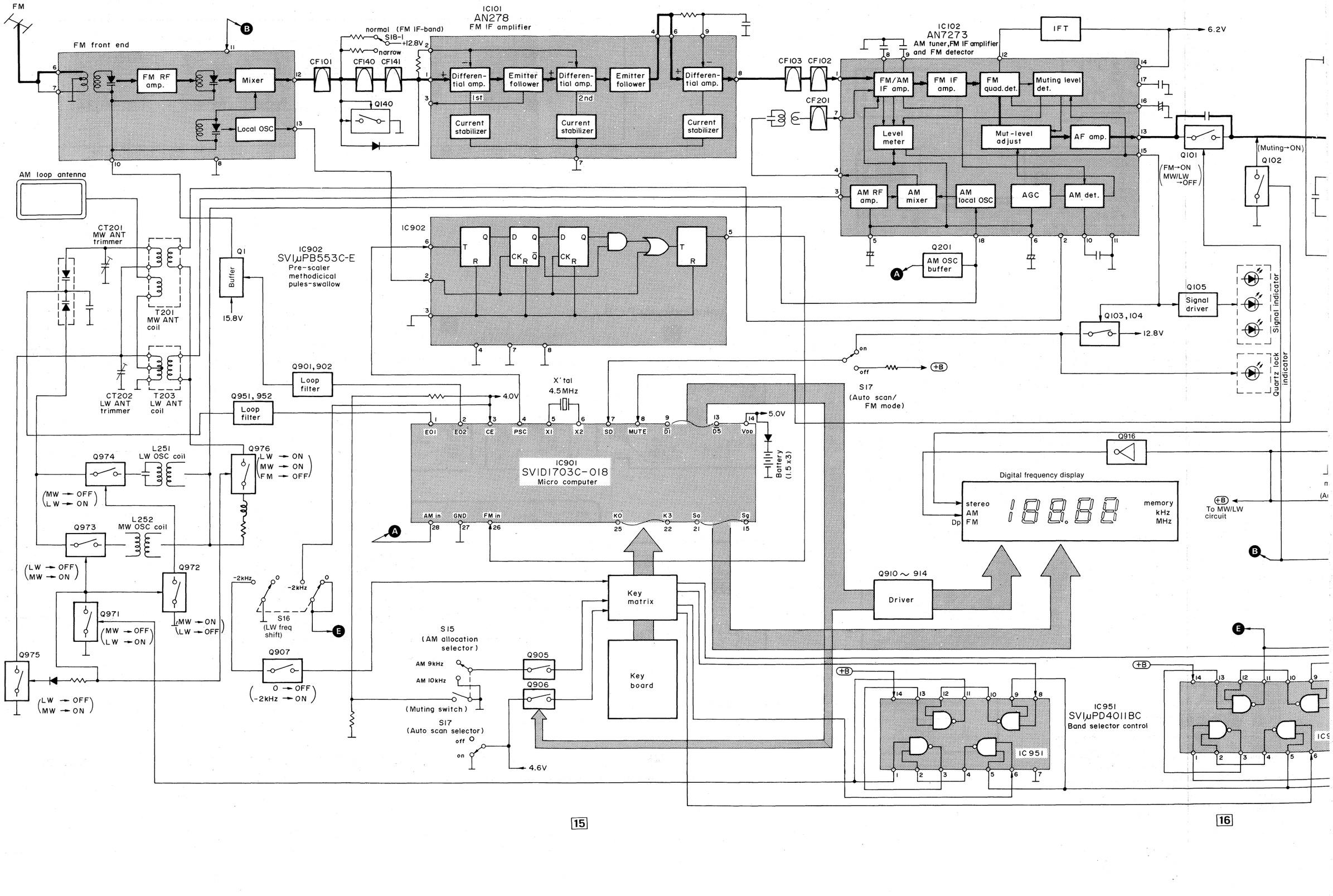


B (FM/MW/LW preset-tuning circuit P.C.B.)



■ BLOCK DIAGRAM

(FM/MW/LW tuner circuit and FM/MW/LW preset-tuning circuit)



IC101
AN278
FM IF amplifier

Differen-tial amp. (1st) → Emitter follower → Differen-tial amp. (2nd) → Emitter follower → Differen-tial amp.
Current stabilizer ×3

CF103 CF102 CF201

IC102
AN7273
AM tuner, FM IF amplifier and FM detector

FM/AM IF amp. → FM IF amp. → FM quad. det. → Muting level det.
Level meter
Mut-level adjust → AF amp.
AM RF amp. → AM mixer → AM local OSC → AGC → AM det.
IFT → 6.2V

Q201
AM OSC buffer

Q101 (FM→ON, MW/LW→OFF)
Q102 (Muting→ON)

IC301
AN7470
FM IF multiprex

AF amp. → MPX → Output amp. → De-emphasis → L channel
Output amp. → De-emphasis → R channel
L channel | To input selector (S402) | R channel
S18-2 (FM IF-band) normal / narrow
Stereo switch
Pilot det.
Phase det.
Divider (19kHz)
Stereo/monaural control
VCO (76kHz)
Divider (38kHz)
Filter
VR301 (VCO adj.)
12.3V

Q105
Signal driver
Signal indicator
Quartz lock indicator

Q103, 104
12.8V

on / off
S17 (Auto scan/FM mode)
+B

X'tal 4.5MHz
4.0V
5.0V
Battery (1.5×3)

IC901
SVIDI703C-018
Micro computer
CO2 CE PSC X1 X2 SD MUTE DI D5 Vpp
GND FM in KO K3 So Sg

Digital frequency display
stereo AM FM Dp
memory kHz MHz

Q915
Stereo ind. Driver

Q916

auto / mono
S17 (Auto scan/FM mode)
(FM→OFF, MW→ON, LW→ON)
Q979
To MW/LW circuit

Q978 (FM→ON, MW→OFF, LW→OFF)
Q977 (FM→ON, MW→OFF, LW→OFF)

Q910 ~ 914
Driver

Key matrix
Key board
Q905
Q906

IC951
SVIμPD4011BC
Band selector control

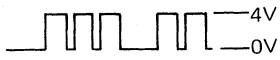
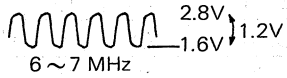
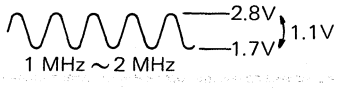
IC952
SVIμPD4011BC
Band selector control

4.6V

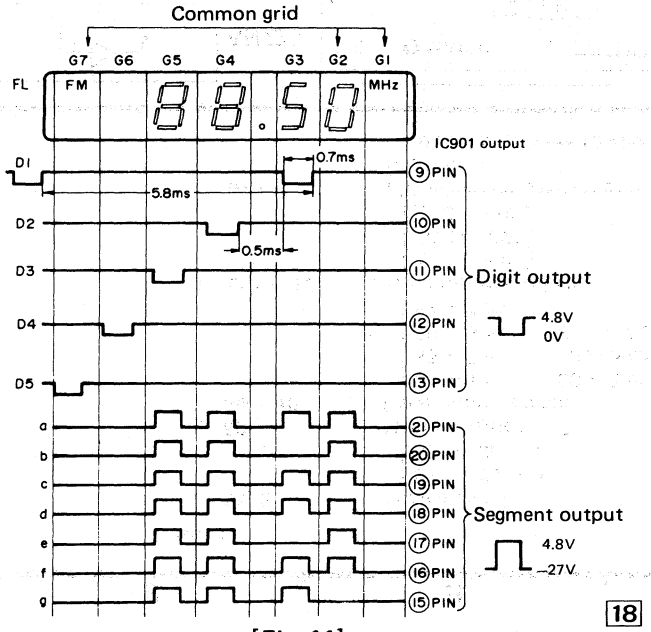
■ TERMINAL OPERATION OF IC901 (SVID 1703C-018)

Pin No.	Mark	Description of terminal
1	E01 (Error out)	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
2	E02 (Error out)	
3	CE (Chip Enable)	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D5) terminals are off, but the memory is held.
4	PSC (Prescaler Control)	This is the Terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (26) until the content of the inside swallow counter is 0. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16.

Pin No.	Mark	Description of terminal
5	X1 (Crystal)	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
6	X2 (Crystal)	
7	SD (Station Detector)	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
8	MUT (Muting)	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level.
9 ~ 13	D1 (Digit Outputs) ~ D5	Digit signal output terminal for display. (Refer to Fig. 11)
15 ~ 21	a (Segment Outputs) ~ g	Segment signal output terminal for display. (Refer to Fig. 11)
14	VDD	Power supply terminal of the device.

Pin No.	Mark	Description of terminal
22 ~ 25	K3 (Key Return Signal Inputs) ~ K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source. 
26	FM (Pulse swallow oscillation input)	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler. 
27	E (Ground)	Ground terminal
28	AM (Direct oscillation input)	Input terminal for AM OSC output. 

Digits and segment output voltage of IC901 (PLL controller)



[Fig. 11]

■ RESISTORS & CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "**S**" mark is service standard parts and may differ from production parts.
5. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS (μF) P = μμF

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : ±2%
ERG : Metal Oxide	12 : 1/2W	J : ±5%
ERO : Metal Film	25 : 1/4W	K : ±10%
ERX : Metal Film	1 : 1W	
ERC : Solid	2 : 2W	
	3 : 3W	
	S1 : 1/2W	

ERD10TLJ □□□ → Chip type carbon
ERO10MKG □□□ → Chip type metal film

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Ref. No.	Part No.	Value
RESISTORS		
R1, 2	ERD10TLJ391U	390
R3, 4	ERO10MKG2213	221K
R5, 6	ERO10MKG5622	56.2K
R7, 8	ERD10TLJ271U	270
R9, 10	ERD10TLJ680U	68
R11, 12	ERD10TLJ184U	180K
R13, 14	ERD10TLJ123U	12K
R15, 16	ERD10TLJ563U	56K
R17, 18	ERD10TLJ102U	1K
R21 (X2)	ERD10TLJ102U	1K
R22 (X2)	ERD10TLJ823U	82K
R23 (X2)	ERO10MKG5622	56.2K
R25 (X2)	ERD10TLJ561U	560
R26 (X2)	ERD10TLJ560U	56
R27 (X2)	ERD10TLJ103U	10K
R28 (X2)	ERD10TLJ331U	330
R29 (X2)	ERD10TLJ272U	2.7K
R30 (X2)	ERD10TLJ104U	100K
R41	ERD10TLJ393U	39K
R42	ERD10TLJ154U	150K
R43, 44	ERD10TLJ103U	10K
R45	ERD10TLJ102U	1K
R46	ERD10TLJ473U	47K
R47	ERD10TLJ103U	10K
R48	ERD10TLJ562U	5.6K
R49, 50	ERD10TLJ103U	10K
R51, 52	ERD10TLJ822U	8.2K

Ref. No.	Part No.	Value
R56	ERD10TLJ103U	10K
R61 ⚠	ERDS1FJ823	82K
R62 ⚠	ERDS1FJ273	27K
R63 ⚠	ERDS1FJ682	6.8K
R64 S	ERD25FJ103	10K
R65 ⚠S	ERD2FCG470	47
R101 S	ERD25FJ331	330
R102 S	ERD25FJ102	1K
R103 S	ERD25FJ181	180
R104 S	ERD25FJ331	330
R105 S	ERD25FJ102	1K
R106 S	ERD25FJ331	330
R107 S	ERD25FJ221	220
R108 S	ERD25FJ472	4.7K
R109 S	ERD25FJ272	2.7K
R110 S	ERD25FJ103	10K
R111, 112 S	ERD25TJ104	100K
R113 S	ERD25FJ103	10K
R115 S	ERD25TJ473	47K
R116 S	ERD25TJ223	22K
R117 S	ERD25FJ472	4.7K
R118 S	ERD25TJ824	820K
R119 S	ERD25FJ681	680
R120 S	ERD25FJ181	180
R121 S	ERD25FJ102	1K
R122 S	ERD25FJ681	680
R123 S	ERD25FJ151	150
R124 S	ERD25FJ100	10
R125 S	ERD25FJ221	220

Ref. No.	Part No.	Value
R126 S	ERD25FJ101	100
R127 S	ERD25FJ102	1K
R128 S	ERD25FJ682	6.8K
R129 S	ERD25FJ222	2.2K
R131 S	ERD25TJ824	820K
R140 S	ERD25TJ684	680K
R141 S	ERD25FJ391	390
R142 S	ERD25FJ103	10K
R143 S	ERD25TJ153	15K
R144 S	ERD25FJ332	3.3K
R145 S	ERD25FJ331	330
R201 S	ERD25FJ472	47K
R203 S	ERD25TJ104	100K
R205 S	ERD25TJ684	680K
R206 S	ERD25FJ562	5.6K
R207 S	ERD25FJ102	1K
R208 S	ERD25FJ103	10K
R209 S	ERD25TJ331	330
R251 S	ERD25FJ103	10K
R252 S	ERD25FJ102	1K
R253 S	ERD25FJ103	10K
R254 S	ERD25FJ102	1K
R255, 256 S	ERD25TJ472	4.7K
R257 S	ERD25TJ122	1.2K
R258 S	ERD25FJ103	10K
R259 S	ERD25FJ562	5.6
R260 S	ERD25FJ470	47
R301 S	ERD25TJ104	100K
R302 ⚠S	ERD2FCG470	47

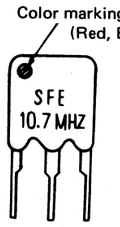
Ref. No.	Part No.	Value
R303 S	ERD25TJ273	27K
R304 S	ERD25TJ394	390K
R305, 306 S	ERD25TJ223	22K
R307, 308 S	ERD25FJ332	3.3K
R309, 310 S	ERD25TJ104	100K
R311 S	ERD25TJ333	33K
R312 S	ERD25FJ472	4.7K
R313 S	ERD25FJ102	1K
R314 S	ERD25TJ123	12K
R315 S	ERD25TJ473	47K
R316 S	ERD25TJ394	390K
R401, 402 S	ERD25FJ222	2.2K
R403, 404 S	ERD25TJ393	39K
R405, 406 S	ERD25TJ183	18K
R411, 412 S	ERD25FJ472	4.7K
R413, 414 S	ERD25FJ472	4.7K
R415, 416 S	ERD25TJ394	390K
R417, 418 S	ERD25TJ104	100K
R501, 502 S	ERD25TJ474	470K
R503, 504 S	ERD25FJ221	220
R505, 506 S	ERD25TJ474	470K
R507, 508 S	ERD25TJ474	470K
R509, 510 S	ERD25FJ102	1K
R511, 512 S	ERD25FJ272	2.7K
R513, 514 S	ERD25FJ392	3.9K
R515, 516 S	ERD25TJ223	22K
R601, 602 S	ERD25FJ102	1K
R603, 604 S	ERD25FJ222	2.2K
R605, 606 S	ERD25FJ272	2.7K

Continued on page 32

- **Use of ceramic filters in pairs**

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.



RANK (color)	D907	D908	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	O	10.73 MHz
Blue	O	O	10.67 MHz

Note: O Mark Diode is used.
X Mark Diode is not used.

FM/MW/LW tuner circuit

MW/LW OSC circuit

SUP24234A

SUP24234D

SUP24231B

IC951,952 SVIμPD4011BC BAND SELECTOR CONTROL

D907	D908	CENTER FREQUENCY
X	X	10.70 MHz
X	O	10.73 MHz
O	O	10.67 MHz

ote: O Mark Diode is used.
X Mark Diode is not used.

Notes:

1. **S1, 2** : Tuning switch. (S1 — down; S2 — up)
2. **S3** : Memory switch.
3. **S4 ~ 10** : Preset-tuning switch. (S4 — 1 ch. S8 — 5 ch. S5 — 2 ch. S9 — 6 ch. S6 — 3 ch. S10 — 7 ch. S7 — 4 ch.)
4. **S11 ~ 13** : Band selector switch. (S11 — FM; S12 — MW; S13 — LW)
5. **S15** : MW allocation selector switch in "**10 kHz step**" position. 9 kHz step ⟷ 10 kHz step
6. **S16** : LW frequency shift switch in "**0**" position. 0 ⟷ –2 kHz
7. **S17** : Automatic-scan/FM mode selector switch in "**on/auto**" position. on/auto ⟷ off/mode
8. **S18** : FM IF band selector switch in "**normal**" position. normal ⟷ narrow
9. **S401 ~ 403** : Input selector switch in "**tuner**" position. (S401 — Aux; S402 — Tuner; S403 — Phono)
10. **S404** : Tape monitor switch in "**source**" position. source ⟷ tape 1 — tape dubbing 1 ▶ 2
11. **S405** : Tape monitor switch in "**source**" position. source ⟷ tape 2
12. **S406** : Loudness switch off ⟷
13. **S801** : Dimension on/o
14. Indicated voltage values are the measured by the DC electronic c with the chassis taken as standa DC circuit tester. Therefore, there may exist some depending on the internal imped
    * Figures in ▭ stand for DC v reception mode.
    * Figures in < > stand for DC v reception mode.
    * Figures in ⌜ ⌟ stand for DC v to on mode.

22 FM/MW/LW preset-tuning circuit

Tuning indicator

12 13 14 15 16

switch in "**0**" position.
mode selector switch in
n.
/mode
switch in "**normal**"
narrow
in "**tuner**" position.

in "**source**" position.
– tape dubbing 1▶2
in "**source**" position.
ape 2

12. **S406** : Loudness switch in "**off**" position.
off ⟷ on
13. **S801** : Dimension on/off switch in "**on**" position.
14. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard internal impedance of the DC circuit tester.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
* Figures in ▭ stand for DC voltage in FM signal (no signal) on reception mode.
* Figures in 〈 〉 stand for DC voltage in FM stereo signal reception mode.
* Figures in ⌜ ⌟ stand for DC voltage in FM (no signal) muting to on mode.
* Figures in ( ) stand for DC voltage with the band selectors circuit set at MW.
* Figures in (( )) stand for DC voltage in LW signal reception mode.

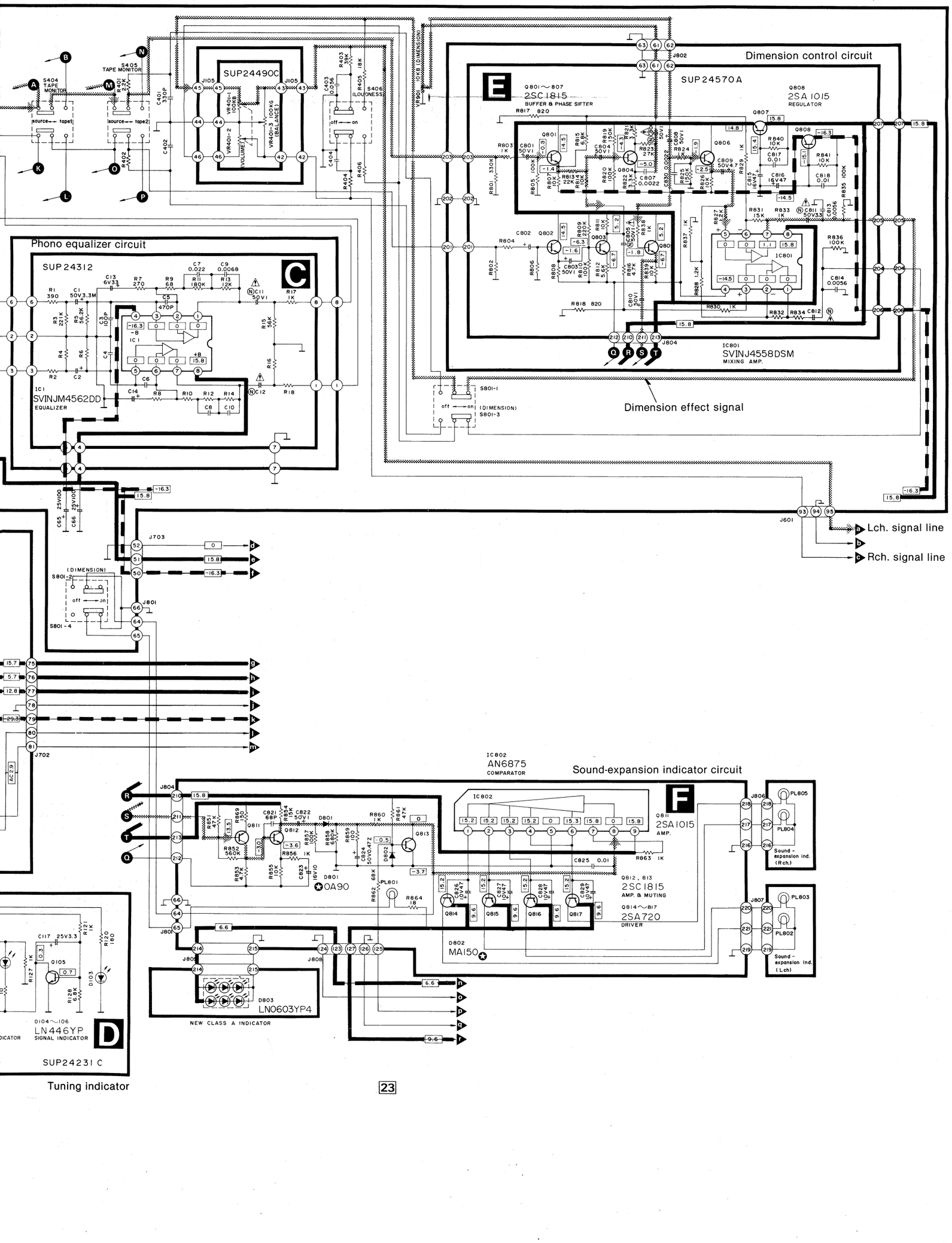
15. Signal lines
⇨ FM signal ▭▭▷ FM OSC signal
Audio frequency signal ➡ MW/LW signal
▪▪▪▶ MW/LW OSC signal ▬ Positive (+B) voltage lines
▪▪▪ Negative (–B) voltage lines
16. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

■ SCHEMATIC DIAGRAM Ⓐ

(**A** FM/MW/LW tuner circuit, **B** FM/MW/LW preset-tuning circuit, **C** Equalizer circuit, **D** Tuning indicator, **E** Dimension control circuit, **F** Sound-expansion indicator and **K** MW/LW OSC circuit)

(This schematic diagram may be modified at any ti with the development of new technology).

* The part No. of transistors, IC and diodes mentioned i the schematic diagram stand for production part No Regarding the part No. with ✪ mark, the productio part No. are different from the replacement part No. Therefore, when placing an order for replacement parts please use the part No. in the replacement parts list.



SUP24490B

SUP 24490A

G **Main amplifier circuit**

SUP 24291 **Voltage amplifier circuit**

H

IC21 AN7060F VOLTAGE AMP.

Bass control (Lch)

Treble control (Lch)

Icq adj. (Lch)

Icq adj. (Lch)

IC501 SVINJ4559DSM TONE AMP.

D613 SVDMZ306

D601, 602, 609, 610 0A 90

D603, 604, 611, 612 MA 150

D605 ~ 608 2 0A90

Q601 2SA1015 SWITCHING

IC 601 SVISTK2038-2 2CH. POWER AMP.

Q20 2SA1123 DRIVER

D21 MA 162A

J601 J703 J702 J808

S501 (SUBSONIC FILTER)

Treble control (Rch)

Bass control (Rch)

Icq adj. (Rch)

Icq adj. (Rch)

SUP 24291 **H** **Voltage amplifier circuit**

(This circuit is the same as left channel.)

SPEAKERS

S601 (MAIN)

S602 (REMOTE)

L MAIN R

SPEAKERS

L REMOTE R

Q41, 42, 43 2SA 1015 SWITCHING & POWER ON/OFF DETECTION

D41, 42 MA 150

D709, 710 SVDSR 1K2

Q44 2SC1815 HOLD CIRCUIT

D43, 44 MA162A

Q45, 46 2SA992 VOLTAGE DET.

Power mute & protection circuit

Q701, 705 2SD880 REGULATOR

Q702, 706, 707 2SC1815 REGULATOR

D707, 708 SVDMZ306 CI

D701 ~ 704 SVDS2V20

Q703 2SB536 REGULATOR

Q704 2SA1015 REGULATOR

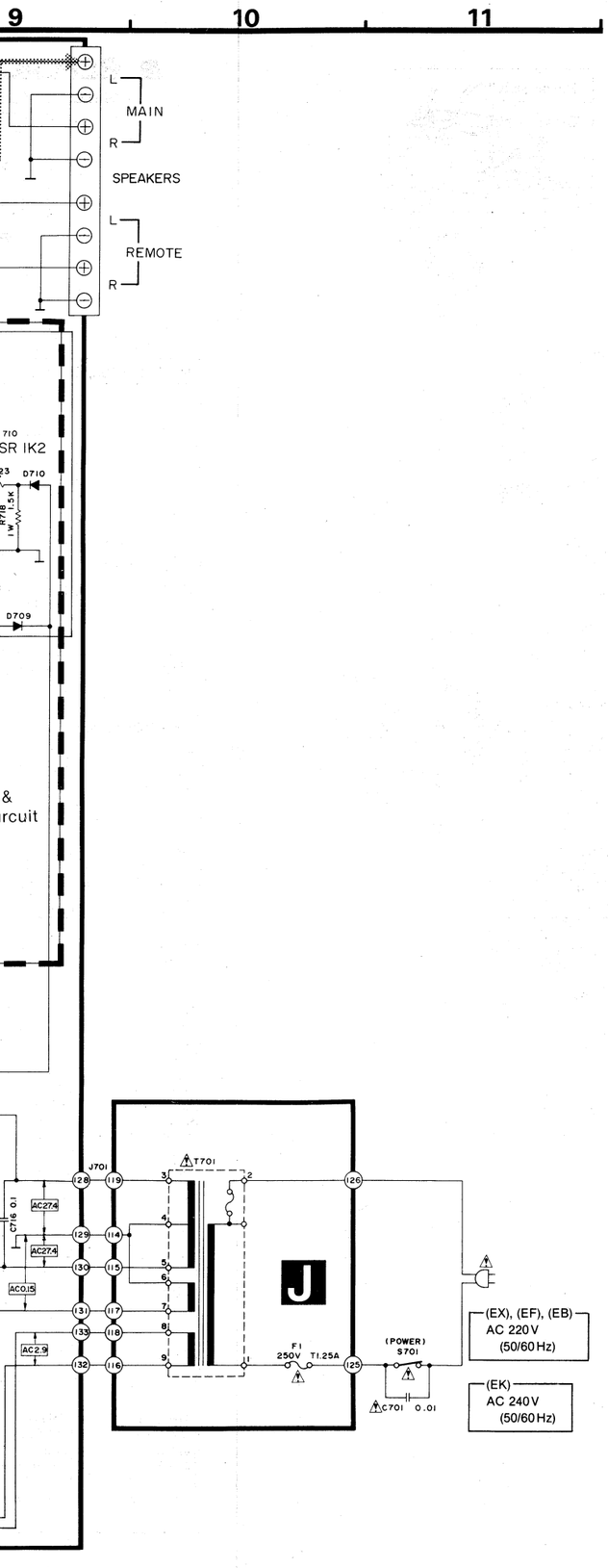
D705 SVDSR1K2

D706 SVDMZ327B

T701

F1 250V T1.25A

J



■ SCHEMATIC DIAGRAM Ⓑ

(G Main amplifier circuit, H Voltage amplifier circuit and I Speaker protection circuit)

(This schematic diagram may be modified at any time the development of new technology.)

* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.

Notes:

1. **S601** : Main Speaker switch in "**on**" position.
   on⟷off
2. **S602** : Remote speaker switch in "**off**" position.
   on⟷off
3. **S603** : Subsonic filter switch in "**off**" position.
   on⟷off
4. **S701** : Power switch in "**on**" position.
   on⟷off
5. ▭ Indicated voltage values are the standard values for the DC electronic circuit tester (high-impedance) with chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
6. ▒▒ Phono signal lines of left channel.
7. ▬ Positive (+B) voltage lines.
   ▬▬ Negative (—B) voltage lines
8. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Continued from page 20

Ref. No.	Part No.	Value
R607, 608 S	ERD25TJ184	180K
R609, 610 S	ERD25TJ184	180K
R611 S	ERD25TJ334	330K
R612 S	ERD25FJ332	3.3K
R613, 614 S	ERG1ANJ100	10K
R615, 616 ⚠	ERDS1FJ100	10
R617 ⚠	ERDS1FJ332	3.3K
R618 ⚠S	ERD25FJ470	47
R619, 620 S	ERG1ANJ331	330
R621, 622 ⚠S	ERD25FJ102	1K
R623, 624 ⚠S	ERD25FJ102	1K
R625, 626 S	ERD25FJ103	10K
R702, 703 ⚠	ERD2FCG121	120
R704, 705 S	ERD25FJ103	10K
R706 S	ERD25FJ472	4.7K
R707 S	ERD25TJ123	12K
R708	ERO25CKF9101	9.1K
R709 S	ERD25TJ153	15K
R710	ERO25CKF1402	14K
R711	ERQ12HJ100	10
R712 ⚠S	ERD25FJ122	1.2K
R713 S	ERD25FJ821	820
R714 S	ERD25FJ681	680
R715 S	ERD25FJ272	2.7K
R716 S	ERD25FJ332	3.3K
R717 ⚠	ERDS1FJ181	180
R718 S	ERG1ANJ152	1.5K
R719 ⚠S	ERD25FJ470	47

Ref. No.	Part No.	Value
R720 S	ERD25TJ274	270K
R721 ⚠S	ERD25FJ821	820
R721 [EK] only	ERG1ANJ821	820
R722 S	ERG3ANJ271	270
R723 ⚠S	ERD25FJ470	47
R723 [EK] only	ERD2FCG121	120
R724 ⚠S	ERD25FJ331	330
R725 ⚠S	ERD25FJ102	1K
R725 [EK] only	ERD2FCG102	1K
R726 S	ERD25FJ102	1K
R801, 802	ERD10TLJ334U	330K
R803, 804	ERD10TLJ102U	1K
R805, 806	ERD10TLJ104U	100K
R807, 808	ERD10TLJ103U	10K
R809	ERD10TLJ224U	220K
R810	ERD10TLJ104U	100K
R811	ERD10TLJ103U	10K
R812	ERD10TLJ562U	5.6K
R813	ERD10TLJ223U	22K
R814	ERD10TLJ103U	10K
R815	ERD10TLJ682U	6.8K
R816	ERD10TLJ472U	4.7K
R817, 818	ERD10TLJ821U	820
R819	ERD10TLJ154U	150K
R820	ERD10TLJ104U	100K
R821, 822	ERD10TLJ332U	3.3K

Ref. No.	Part No.	Value
R823	ERD10TLJ273U	27K
R824	ERD10TLJ102U	1K
R825	ERD10TLJ154U	150K
R826	ERD10TLJ103U	10K
R827	ERD10TLJ122U	1.2K
R828	ERD10TLJ122U	1.2K
R829, 830	ERD10TLJ102U	1K
R831, 832	ERD10TLJ153U	15K
R833, 834	ERD10TLJ102U	1K
R835, 836	ERD10TLJ104U	100K
R837	ERD10TLJ102U	1K
R838	ERD10TLJ102U	1K
R839, 840	ERD10TLJ103U	10K
R841	ERD10TLJ103U	10K
R851	ERD10TLJ473U	47K
R852	ERD10TLJ564U	560K
R853	ERD10TLJ472U	4.7K
R854	ERD10TLJ153U	15K
R855	ERD10TLJ103U	10K
R856	ERD10TLJ102U	1K
R857	ERD10TLJ104U	100K
R858	ERD10TLJ684U	680K
R859	ERD10TLJ101U	100
R860	ERD10TLJ102U	1K
R861	ERD10TLJ473U	47K
R862	ERD10TLJ683U	68K
R863 S	ERD25FJ102	1K
R864 ⚠	ERDS1FJ180	18

Ref. No.	Part No.	Value
R869	ERD10TLJ151U	150
R901 S	ERD25FJ102	1K
R902 S	ERD25FJ561	560
R903 S	ERD25FJ682	6.8K
R904 S	ERD25TJ224	220K
R906 S	ERD25TJ224	220K
R908 S	ERD25TJ104	100K
R909, 910 S	ERD25TJ104	100K
R912, 913 S	ERD25TJ223	22K
R914, 915 S	ERD25TJ223	22K
R916, 917 S	ERD25TJ223	22K
R918 S	ERD25TJ223	22K
R919 S	ERD25TJ104	100K
R920 S	ERD25TJ333	33K
R921 S	ERD25TJ104	100K
R922 S	ERD25FJ561	560
R923 S	ERD25TJ224	220K
R924 S	ERD25TJ104	100K
R925 S	ERD25FJ103	10K
R926 S	ERD25FJ221	220
R928 S	ERD25TJ824	820K
R929, 930 S	ERD25FJ102	1K
R951 S	ERD25FJ102	1K
R952 S	ERD25FJ392	3.9K
R953 S	ERD25TJ153	15K
R954 S	ERD25FJ471	470
R971 S	ERD25TJ473	47K
R972, 973 S	ERD25TJ333	33K
R974 S	ERD25FJ222	2.2K

Numbering System of Capacitor

Example

ECKD	1H	102	M	D
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA :Electrolytic	OJ : 6.3V	1H : 50V DC	C : ±0.25pF
ECEA. . . N : Non Polar Electrolytic	1A : 10V	2H : 500V DC	J : ±5%
ECCD :Ceramic	1C : 16V	KC : 400V AC	K : ±10%
ECKD :Ceramic	1E : 25V		Z : +80%, —20%
ECQM :Polyester	1H : 50V		P : +100%, —0%
ECQP :Polypropylene	1J : 63V		
ECET :Electrolytic	50 : 50V		
	25 : 25V		

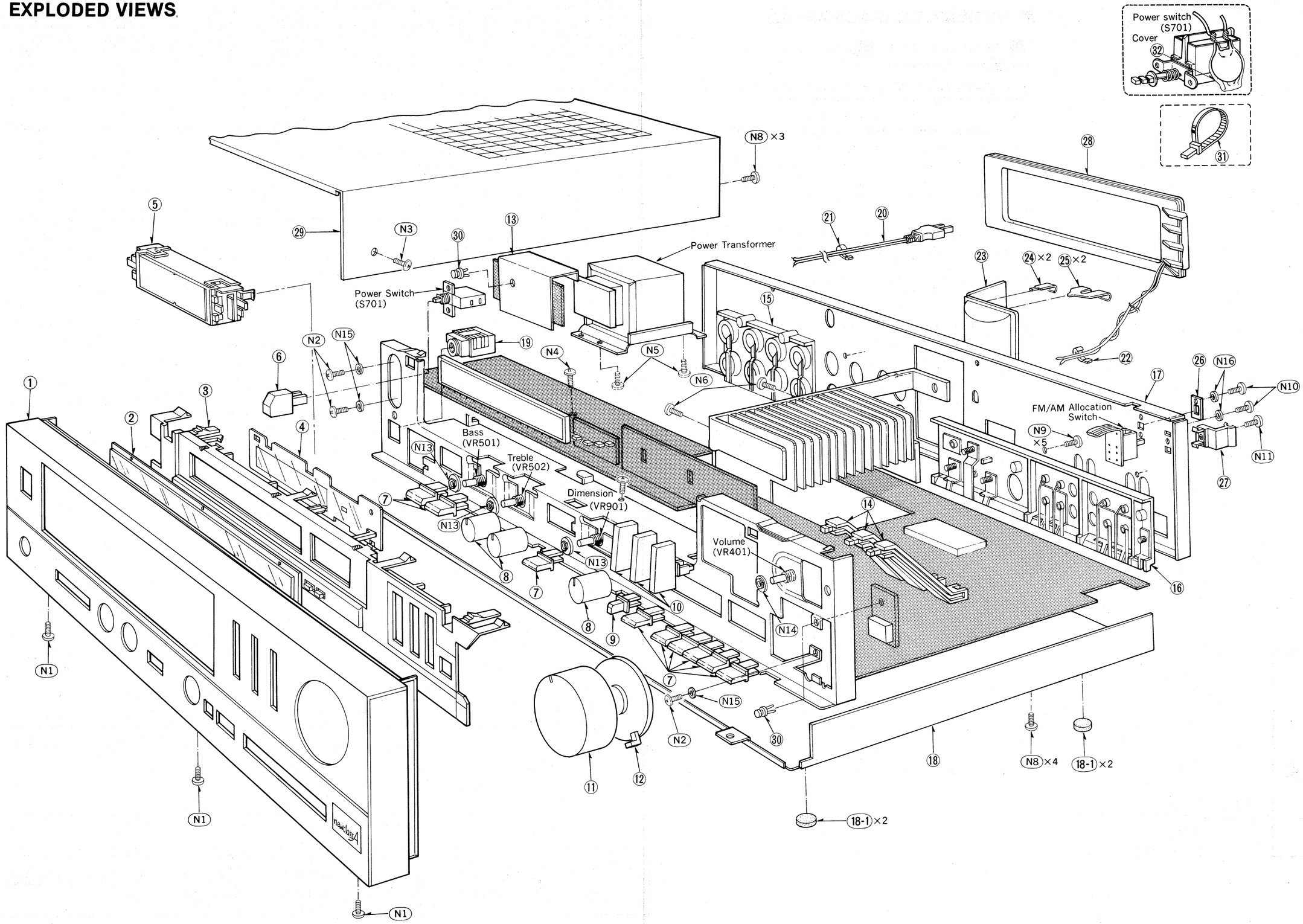
Ref. No.	Part No.	Value
CAPACITORS		
C1, 2 S	ECEA50M3R3R	3.3
C3, 4 S	ECCD1H101K	100P
C5, 6 S	ECKD1H471KB	470P
C7, 8 S	ECQM1H223JZ	0.022
C9, 10 S	ECQM1H682JZ	0.0068
C11, 12 ⚠S	ECEA1HN010S	1
C13, 14 S	ECEA1CS330	33
C21 (X2) S	ECEA50M3R3R	3.3
C22 (X2) S	ECCD1H390K	39P
C25 (X2) S	ECCD1H050C	5P
C26 (X2) S	ECKD1H681KB	680P
C27 (X2) S	ECCD1H560K	56P
C28 (X2) S	ECCD1H820K	82P
C29 (X2) S	ECCD1H050C	5P
C30 (X2) S	ECCD1H220K	22P
C31 (X2) S	ECQM1H152JZ	0.0015
C32 (X2) S	ECEA1HS100	10
C41, 42 S	ECEA1JS330	33
C43, 44 S	ECEA50Z3R3	3.3
C45, 46 ⚠	ECEA1HN010S	1
C65, 66 S	ECEA1ES101	100
C67 S	ECKD1H103ZF	0.01
C70 S	ECKD1H102ZF	0.001
C71 S	ECEA50Z3R3	3.3
C72 S	ECKD1H333ZF	0.033
C73 S	ECKD1H102ZF	0.001
C76 S	ECKD1H103ZF	0.01
C78, 79 S	ECKD1H103ZF	0.01
C101 S	ECKD1H223ZF	0.022
C102, 103 S	ECKD1H103ZF	0.01
C104, 105 S	ECKD1H103ZF	0.01
C106 S	ECKD1H223ZF	0.022
C107 S	ECCD1H101K	100P
C108 S	ECQM1H223JZ	0.022
C109 S	ECEA50Z1	1

Ref. No.	Part No.	Value
C110, 111 S	ECKD1H103ZF	0.01
C112 S	ECEA25Z4R7	4.7
C113 S	ECEA1CS330	33
C114 S	ECEA50Z3R3	3.3
C115 S	ECEA50Z1	1
C116 S	ECEA1AS470	47
C117 S	ECEA50Z3R3	3.3
C118 S	ECKD1H102ZF	0.001
C120, 121 S	ECKD1H103ZF	0.01
C140 S	ECKD1H103ZF	0.01
C141 S	ECCD1H470K	47P
C142 S	ECKD1H103ZF	0.01
C143	ECEA1CN330	33
C202 S	ECKD1H223ZF	0.022
C204 S	ECCD1H150KC	15P
C205 S	ECKD1H223ZF	0.022
C206 S	ECEA1AS101	100
C207 S	ECEA25Z4R7	4.7
C208 S	ECEA1HS100	10
C209 S	ECKD1H103ZF	0.01
C210	ECQM1H473KV	0.047
C251	ECQP1271JZ	270P
C252	ECQP1471JZ	470P
C253 S	ECCD1H101KC	100P
C254, 255 S	ECQM1H223JZ	0.022
C301	ECEA1CS221	220
C302	ECQM1H473KV	0.047
C303 S	ECCD1H470K	47P
C304, 305 S	ECEA50ZR47	0.47
C306 S	ECEA50ZR47	0.47
C307, 308 S	ECQM1H153JZ	0.015
C309 S	ECKD1H223ZF	0.022
C310 S	ECEA50Z1	1
C311 S	ECEA50Z3R3	3.3
C312 S	ECQP1471JZ	470P
C313 S	ECKD1H103ZF	0.01
C314 S	ECKD1H223ZF	0.022
C401, 402 S	ECKD1H331KB	330P

Ref. No.	Part No.	Value
C403, 404	ECQM1H563KV	0.056
C501, 502 S	ECQM1H223JZ	0.022
C503, 504 S	ECEA50Z3R3	3.3
C505, 506 S	ECCD1H101K	100P
C507, 508 S	ECCD1H390K	39P
C509, 510 S	ECCD1H390K	39P
C511, 512 S	ECEA50Z1	1
C513, 514 S	ECQM1H333JZ	0.033
C515, 516 S	ECQM1H332JZ	0.0033
C517, 518	ECQM1H104KV	0.1
C519, 520 S	ECQM1H183JZ	0.018
C601, 602 S	ECKD1H103ZF	0.01
C603, 604 ⚠S	ECEA1HN3R3S	3.3
C605, 606 S	ECKD1H681KB	680P
C607, 608 S	ECKD1H681KB	680P
C609, 610 S	ECCD1H101K	100P
C611, 612	ECQM1H563KV	0.056
C613 S	ECEA1HS221	220
C615 S	ECEA2AS3R3	3.3
C617, 618 S	ECKD1H102KB	0.001
C619, 620	ECQM1H563KV	0.056
C701 ⚠	ECKDKC103PF	0.01
C702 S	ECKD1H103ZF	0.01
C703 S	ECEA1AS472	4700
C704, 705	ECETS45V822U	8200
C706, 707 S	ECKD1H103ZF	0.01
C708 S	ECKD1H103ZF	0.01
C709 S	ECEA1ES101	100
C710 S	ECEA1HS100	10
C711 S	ECKD1H103ZF	0.01
C712 S	ECEA2AS100	10
C713, 714 S	ECEA1HS100	10
C715 S	ECKD1H333ZF	0.033
C716	ECQE1104KN	0.1
C718 S	ECKD1H103ZF	0.01
C730 S	ECKD1H223ZF	0.022
C731 S	ECEA1HS100	10

Ref. No.	Part No.	Value
C801, 802 S	ECEA50Z1	1
C803, 804 S	ECEA50Z1	1
C805, 806 ⚠	ECEA1HN010S	1
C807 S	ECQM1H222KZ	0.0022
C808 S	ECEA50Z1	1
C809 S	ECEA50Z4R7	4.7
C810 S	ECEA50Z1	1
C811, 812 ⚠	ECEA1HN3R3S	3.3
C813, 814 S	ECQM1H562JZ	0.0056
C815, 816 S	ECEA1ES470	47
C817, 818 S	ECKD1H103ZF	0.01
C821 S	ECCD1H680K	68P
C822 S	ECEA50Z1	1
C823 S	ECEA1HS100	10
C824 S	ECEA50ZR47	0.47
C825 S	ECKD1H103ZF	0.01
C826, 827 S	ECEA1AS470	47
C828, 829 S	ECEA1AS470	47
C830 S	ECQM1H222KZ	0.0022
C901 S	ECKD1H103ZF	0.01
C902 S	ECEA50M4R7R	4.7
C903, 904 S	ECKD1H103ZF	0.01
C905 S	ECCD1H180KC	18P
C906 S	ECCD1H150KC	15P
C907 S	ECEA0JS102	1000
C908 S	ECEAOJS102	1000
C909 S	ECEA1HS470	47
C910 ⚠	ECEA1HN010S	1
C911 S	ECEA1ES470	47
C912 S	ECKD1H103ZF	0.01
C913, 914 S	ECKD1H223ZF	0.022
C915 ⚠	ECEA1EN100	10
C951	ECQM1H273KZ	0.027
C952	ECEA1HSR33	0.33
C953	ECCD1H560K	56P
C954 S	ECKD1H103ZF	0.01

■ EXPLODED VIEWS



■ REPLAC

Notes:
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Ref. No.		Part No.
INTEGRATED CIRCUITS		
IC1		SVINJM456
IC21 (X2)		AN7060F
IC101		AN278
IC102		AN7273
IC301		SVIUPC116
IC501		SVINJ4559(
IC601		SVISTK203(
IC801		SVINJ4558(
IC802		AN6875
IC901		SVID1703C(
IC902		SVIUPB553.
IC951, 952		SVIUPD401
TRANSISTORS		
Q1	S	2SC945–Q
Q20 (X2)		2SA1123–R
Q41 ~ 43		2SA1015–Y
Q44		2SC1815–Y
Q45, 46	S	2SA992
Q101 ~ 103	S	2SC1685–S
Q104		2SA1015–Y
Q105		2SD661–S
Q140		2SC829–C
Q201		2SD636–R
Q601		2SA1015–Y
Q701		2SD880–Y
Q702		2SC1815–Y
Q703	S	2SB536–L
Q704		2SA1015–Y
Q705		2SD880–Y
Q706, 707		2SC1815–Y
Q801 ~ 806		2SC1815–Y
Q807		2SC1815–G
Q808		2SA1015L–
Q811		2SA1015–Y
Q812, 813		2SC1815–Y
Q814 ~ 817		2SA720–Q
Q901, 902		2SD661–S
Q905		2SA1015–Y
Q906		2SB641
Q907		2SB641
Q908, 909		2SC1685–S
Q910 ~ 916		2SA1015–Y
Q951, 952		2SD636
Q971 ~ 975		2SD636
Q976		2SB641
Q977		2SC1685–S
Q978, 979		2SA1015–Y

■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicafed on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice.
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specity the area.
   Parts without these indications can be used for all areas.
4. The "**S**" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.
6. [K] -marked parts are used for black only, while ○-marked parts are for silver type only.
7. Parts other than [K] -and ○-marked are used for both black and silver types.

Areas

* [EX] is available in Switzerland and Scandinavia.
* [EF] is available in France.
* [EB] is available in Belgium.
* [EK] is available in United Kingdom.

Black type model No. : SA–323L (K)

Ref. No.		Part No.	Description
INTEGRATED CIRCUITS			
IC1		SVINJM4562DD	Equalizer Amplifier
IC21 (X2)		AN7060F	Voltage Amplifier
IC101		AN278	FM IF Amplifier
IC102		AN7273	FM IF, AM Converter
IC301		SVIUPC1161C3	FM MPX (Product Part No. is AN7470)
IC501		SVINJ4559DSM	Tone Amplifier
IC601		SVISTK2038–2	Power Amplifier
IC801		SVINJ4558DSM	Mixing Amplifier
IC802		AN6875	Sound-Expansion Indicator Comparator
IC901		SVID1703C018	Micro-Computer
IC902		SVIUPB553AC	Pre-Scaler
IC951, 952		SVIUPD4011BC	Band Selector Control
TRANSISTORS			
Q1	S	2SC945–Q	Switching
Q20 (X2)		2SA1123–R	Driver
Q41 ~ 43		2SA1015–Y	Switching, Power ON/OFF Detection & Hold Circuit
Q44		2SC1815–Y	Hold Circuit
Q45, 46	S	2SA992	Voltage Detector
Q101 ~ 103	S	2SC1685–S	Switching
Q104		2SA1015–Y	Switching
Q105		2SD661–S	Signal Driver
Q140		2SC829–C	FM IF Selector
Q201		2SD636–R	AM OSC Buffer
Q601		2SA1015–Y	Speaker Protection Switch
Q701		2SD880–Y	Regulator
Q702		2SC1815–Y	Regulator
Q703	S	2SB536–L	Regulator
Q704		2SA1015–Y	Regulator
Q705		2SD880–Y	Regulator
Q706, 707		2SC1815–Y	Regulator
Q801 ~ 806		2SC1815–Y	Buffer
Q807		2SC1815–GR	Regulator
Q808		2SA1015L–G	Regulator
Q811		2SA1015–Y	Amplifier
Q812, 813		2SC1815–Y	Muting
Q814 ~ 817		2SA720–Q	Sound-Expansion Indicator Switch
Q901, 902		2SD661–S	Loop Filter
Q905		2SA1015–Y	Key Matrix Switch
Q906		2SB641	Key Matrix Switch
Q907		2SB641	Key Matrix Switch
Q908, 909		2SC1685–S	Key Matrix and Driver
Q910 ~ 916		2SA1015–Y	Frequency Indicator Driver
Q951, 952		2SD636	Loop filter
Q971 ~ 975		2SD636	Switching
Q976		2SB641	Switching
Q977		2SC1685–S	Band Selector Control
Q978, 979		2SA1015–Y	Band Selector Control

Ref. No.		Part No.	Description
DIODES			
D21 (x 2)	S	MA162A	Switching
D41 ~ 44	S	MA162A	Switching
D101	S	MA27W–A	Switching
D102	S	MA162A	Detector
D103		LN846RP	Quartz Lock Indicator
D104 ~ 106		LN446YP	Signal Indicator
D140 ~ 142	S	MA162A	Detector
D201		SVDKV1236Z	Detector
D202	S	MA162A	Switching
D251	S	MA162A	Switching
D301, 302	S	MA162A	Switching
D601, 602	S	20A90	Synchronous Bias
D603, 604	S	MA162A	Switching
D605 ~ 608	S	20A90	Switching
D609, 610	S	20A90	Switching
D611, 612	S	MA162A	Switching
D613		SVDMZ306	6V, Zener
D701 ~ 704	⚠	SVDS2V20	Rectifier
D705	⚠	SVDSR1K2	Rectifier
D706		SVDMZ327B	27V, Zener
D707, 708		SVDMZ306C1	6V, Zener
D709, 710		SVDSR1K2	Rectifier
D801	S	20A90	Switching
D802	S	MA162A	Switching
D803		LN0603YP4	New Class A Indicator
D903	S	MA162A	Switching
D905	S	MA162A	Switching
D907 ~ 919	S	MA162A	Switching
D921	S	2–OA99	Switching
D922		SVDMZ306B	6V, Zener
D923	S	MA162A	Switching
D951 ~ 960	S	MA162A	Switching
CERAMIC FILTERS			
CF101, 102, 141		SVFE107MM–A	FM, 10.70 MHz (Red)
		SVFE107MM–B	FM, 10.68 MHz (Blue)
		SVFE107MM–C	FM, 10.72 MHz (Orange)
CF140		SVFE107MZ2–A	FM, 10.70 MHz (Red)
		SVFE107MZ2–B	FM, 10.68 MHz (Blue)
		SVFE107MZ2–C	FM, 10.72 MHz (Orange)
CF201		SVFSFP450HT	AM, 450 kHz (Use pair ranks as same as CF101, CF102, CF140 and CF141)
COMPONENT COMBINATIONS			
Z301, 302		EXRP181K473T	47kΩ, 180pF
Z701, 702	⚠	SXRFS203ZSM	0.01μF x 2
Z901, 902		EXBP87104K	100kΩ x 7
Z903		EXFP7331MH	330pF x 4
Z951		EXBP85104K	100kΩ x 5
COILS			
L101		SLM1C61–P	Filter
L251		SLOIC17–P	LW OSC
L252		SLO2C31R–P	MW OSC
L253		SLQX101–3M	Choke coil
L601, 602		SLQY15G–30	Choke
TRANSFORMERS			
T101		SLI4C535–Z	FM Dscri. IFT

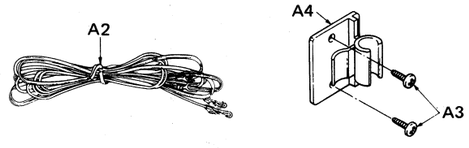
Ref. No.		Part No.	Description
T102		SLI4C537–Z	FM Distortion Adjustment
T201		SLA2C7–P	MW Antenna
T202		SLI2C141–M	MW IFT
T203		SLA1C15R–P	LW Antenna
T701 [EX, EF, EB]	⚠	SLT5N387	Transformer, Power Source
T701 [EK]	⚠	SLT5N389	Transformer, Power Source
FLUORESCENT DISPLAY TUBE			
FL		SAD7MT29ZA	Digital Frequency Display Tube
CRYSTAL			
X901		SVQ43U452	Crystal, 4.5 MHz Counter Oscillator
SWITCHES			
S1 ~ 13		SSG13	Manual Tuning, Memory, Band Selector, and Preset-Tuning
S15		SSS43	FM/AM Allocation Selector
S16, 17, 18 404 ~ 406		SSH629	Tape Monitor, Band Selector, Automatic-Scan, FM Mode Selector and Loudness. FM IF Band Selector
S401 ~ 403		SSH3041	Input Selector
S601, 602		SSH2017	Speaker Selector
S603		SSH165	Subsonic Filter
S701 [EF, EB, EK]	⚠	ESB90619S	Power
S701 [EX] only	⚠	ESB822S	Power
S801		SSH1045	Dimension
VARIABLE RESISTORS			
VR301	S	EVNM4AA00B14	VCO, Adjustment, 10kΩ (B)
VR401		EWK3FAF24869	Volume and Balance Control
VR501, 502		EWCXAA000C15	Bass and Treble Control
VR601, 602	S	EVNM4AA00B53	ICQ, Adjustment
VR901		EWHFPA002B15	Dimension Control

Ref. No.		Part No.	Description
VARIABLE CAPACITORS			
CT201		SVCTZ03T110F	MW Antenna Trimmer
CT202		ECVIZW20X53N	LW Antenna Trimmer
FUSES			
F1	⚠	XBA2C12TR0	250V, T1,25A
F701	⚠	EYP2AS109	Thermal Fuse, 125V 109°C
LAMP			
L801 ~ 805	⚠	XAMS4Q17	Sound-Expansion Indicator
FM FRONT END			
		SNVFE306E05	P.C.B. Ass'y (Front End)
CABINET and CHASSIS PARTS			
1	○	SGWA323LE	Panel, Front Ass'y (Silver) (1)
1	[K]	SGWA323LKE	Panel, Front Ass'y (Black) (1)
2		SGU297	Transparent Panel (1)
3	○	SGXA323LE	Front Sub Panel Ass'y (Silver) (1)
3	[K]	SGXA323LKE	Front Sub Panel Ass'y (Black) (1)
4	○	SDU121	Filter (Silver) (1)
4	[K]	SDU121–1	Filter (Black) (1)
5	○	SWV41	Indicator, Dimension (1)
5	[K]	SWV41–1	Indicator, Dimension (1)
6		SBC337–1	Button, Power (1)
7		SBC455	Button, Push Switch (9)
8		SBN1115	Knob, Bass, Treble, Balance (3)
9		SBC475	Button (1)
10		SBC453	Button, Input Selector (3)
11		SBN1121	Knob (1)
12		SBN1119–1	Knob (1)
13		SMX585–1	Insulator Plate (1)
14		SUB93	Connection Rod (3)
15		SJF4815	Terminal Board, Speaker (1)
16		SJF8037–3N	Terminal Board IN/OUT Put (1)
17 [EK]		SGP3010–7C	Panel Rear (1)
17 [EX]		SGP3010–7D	Panel Rear (1)
17 [EF, EB]		SGP3010–7E	Panel Rear (1)
18		SYUA323EX	Bottom Board Ass'y (1)
18–1		SKL245–2	Foot (4)
19		SJJ69–1	Jack (1)
20	⚠	SJA88	AC Cord (1)
20 [EK] only	⚠	QFC1205M	AC Cord (1)
21		SHR127	Bushing (1)
21 [EK] only		SHR129	Bushing (1)

Ref. No.		Part No.	Description
22		RHR111	Bushing (1)
23		SJB3005–1	Battery Case (1)
24		SJC7	Terminal, Battery (2)
25		SJC9	Terminal, Battery (2)
26		SHR5025–1	Stopper, Allocation Switch (1)
27		SMA231	Holder, Loop Antenna (1)
28		SSA609	Loop Antenna (1)
29	○	SKC1010S1	Cabinet (Silver) (1)
29 [EK] only	○	SKCA212LE	Cabinet (Silver) (1)
29	[K]	SKC1010BB1	Cabinet (Black) (1)
30		SHR401–1	Pin (2)
31		SHR301	Clamper (3)
32		SMXA65	Cover (1)
SCREWS			
N1	S	XTB3+8BFN	Tapping, ⊕ 3 x 8 (3)
N2	S	XSN3+6S	⊕ 3 x 6 (3)
N3	○	SNE2095–2	Cabinet (Silver) (2)
N3	[K]	SNE2095–3	Cabinet (Black) (2)
N4		XTBS3+8BFZ1	Tapping with Detent (1)
N5	S	XTB3+10BFZ	Tapping, ⊕ 3 x 10 (2)
N6	S	XTB3+16BFN	Tapping, ⊕ 3 x 16 (2)
N8	S	XTB3+8BFN	Tapping, ⊕ 3 x 8 (7)
N9		XTBS3+8BFZ1	Tapping with Detent (5)
N10		XSN26+5FZ	⊕ 2.6 x 5 (2)
N11	S	XTB3+10BFZ	Tapping, ⊕ 3 x 10 (1)
N12	S	XTB3+8BFZ	Tapping, ⊕ 3 x 8 (2)

Ref. No.		Part No.	Description
NUTS			
N13		SNE4021	Bass, Treble, Dimension (3)
N14		SNE4043	Volume (1)
WASHERS			
N15	S	XWA3B	Spring, ϕ3 (3)
N16	S	XWA26BFZ	Spring, ϕ2.6 (2)
ACCESSORIES			
A1		SQF11241	Instructions Book (1)
A1 [EK] only		SQF11243	Instructions Book (1)
A1 [EF] only		SQF11245	Instructions Book (1)
A2		SSA267	Cord, FM Indoor Antenna (1)
A3		XTN3+10AFZ	Screw (2)
A4		SMA233–1	Holder, Loop (1)
PACKING PARTS			
P1	○	SPG3927	Carton Box (Silver) (1)
P1 [EF]	○	SPG3929	Carton Box (Silver) (1)
P1	[K]	SPG3931	Carton Box (Black) (1)
P2		SPS3519	Pad, Left (1)
P3		SPS3521	Pad, Right (1)
P4		SPS3523	Pad, Upper (1)
P5	○	SPP699	Polyethylene Bag (Silver) (1)
P5	[K]	SPP649	Polyethylene Bag (Black) (1)

• Accessories



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